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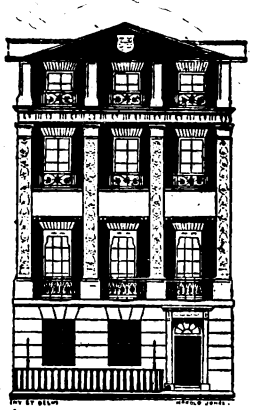

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TRAUMATIC ARTERIAL SPASM*

SOL. M. COHEN, MA CAPE TOWN, FRCS
SURGEON IN CHARGE OF A SURGICAL DIVISION AT AN EMS HOSPITAL

EARLY in 1794 William Pitt, the younger, then Prime Minister, was approached to buy the museum of John Hunter—dead a few months—for the state. "What!" said he. "Buy preparations! Why I have not enough to purchase gunpowder." A hundred and forty-six years later, German gunpowder was to shatter much of Hunter's monument. But a memory that has blossomed with the years remains, and today we meet as a tribute of respect to that memory. The subject—traumatic arterial spasm—is particularly appropriate, for he made it his special study.

John Hunter had a very simple explanation of traumatic arterial spasm—namely, that an injured vessel has a natural disposition to contract. An understanding of this natural disposition of the smooth muscle of the arterial wall is a great help in explaining the apparently peculiar responses of the vessel. Smooth muscle responds to a greater variety of stimuli than does skeletal muscle. It responds to stretch, whereas skeletal muscle does not. Rapid stretching is always a more effective stimulus than slow stretching. If we apply this, we appreciate why the recently manipulated fracture, or the "near miss" of a vessel by gunshot or bomb splinter, often initiates spasm. The fracture spike or the exploding force twangs the elastic vessel, which recoils like a guitar string and responds by contraction. When plain muscle contracts the fibres may decrease to ¼ of their resting length (Wiggers 1937). The major peripheral vessel may contract till it appears as a mere thread. This contraction in the vessel may be maintained in a state of complete tetanus, unremitting even while the tissues around are dead or dying; for smooth muscle maintains its new length with little increase in its oxygen consumption, and without rapid fatigue. The behaviour of smooth muscle at times appears bizarre. Professor Bard (1941) points out that often a mechanical stimulus which causes contraction when applied to a muscle in a state of slight tonic contraction, evokes relaxation when the tone is great. Thus, in attempting to suture a divided vessel the contracted ends at first appear to make this impossible—but, as gentle traction is applied by means of the stay sutures, the vessel wall relaxes.

Smooth muscle has another property—rhythmicity. Often after the trauma of a peri-arterial stripping, peristaltic waves may be seen rippling along the vessel wall. John Hunter noted as he watched the contracted cut vessel that "it sometimes appeared as if this was not permanent, but contracted and relaxed at intervals." Perhaps the most remarkable property of smooth muscle is tonus, whereby the muscle-fibres "exist now at one length, now at another, under equal degrees of tension" (Bard). We are familiar with tone in the stomach or bladder, which may contain say 5 oz. or 15 oz. and yet the pressure within remains the same, but I want to apply this concept to the collateral circulation which is also maintained in a state of tone. This is not a pathological state, and there is need for re-orientation of our attitude that when a vessel is ligatured, nature (in her folly) maintains a pathological cramp of the collaterals.

THE COLLATERAL CIRCULATION

The collaterals are most numerous around joints, and they exist not as a "spare" for use when trauma or ligature occludes the main vessel, but to carry on the circulation when, in certain attitudes, such as acute flexion at the elbow or knee-joint, the main vessel becomes kinked or pressed upon. When the main vessel lumen is restored, the flow in the collaterals returns to normal. The deflection of blood under such circumstances is temporary, and the collaterals can meet the need. If the occlusion of the main vessel is prolonged, whether by spasm, trauma or ligature, then the greater demands can be met only by enlargement of the vessels. This is a slow process, completely unlike reflex action, as it is often described. It takes 4 days in the arm, and 14 days or more in the leg for the distal pulse to return after complete occlusion of the main vessel. The full return of the circulation takes years, during which the collateral vessels gradually enlarge by an active growth, both in diameter and length, becoming tortuous. In an experimental study, Weyrauch and de Garis (1937) have shown that after ligature of a main vessel, the blood volume in the adjacent capillaries increases, connective tissue and muscle are added to them, and they thus become arterioles and venules. Striated muscle is extremely sensitive to oxygen lack and ischæmia of 6–12 hours usually means death; skin on the other hand, as Lewis (1936) declares, can withstand 24–48 hours loss of blood-supply. To divert this blood early into the muscle capillaries rather than the skin is therefore important. The skin of the ligatured limb feels cold at first, which suggests that this is actually taking place. The collateral circulation does meet the demand even in the early stages because the needs of resting muscle are small. For example, in arteriosclerosis and Buerger's disease, the blood-flow has to be reduced to one-third of the normal before symptoms and trophic changes appear (Kunkel and Stead 1938). In fact, it is rare for gangrene to follow simple ligature of a main vessel. Sencert (1918) ligatured 70 main vessels, and in only 2 cases, one a common femoral and one a popliteal, was it followed by gangrene. But the trauma that injures the vessel and initiates the main-vessel spasm is as likely to affect or damage the collaterals—and this is what often decides the fate of the limb. The following case shows how spasm may affect the main vessel and its distributing collaterals at the same time.

An American soldier fell 4 storeys fracturing the humerus in the middle and also in the supracondylar region. Through an axillary laceration the axillary artery could be seen pulsating. But there was no radial or ulnar pulse and the hand was cold. The brachial artery at the elbow was explored and found to be so small that the surgeon, Mr. Irving Zieve, told me he could not at first believe that it was the brachial artery. Periarterial stripping made no difference. The case was transferred subsequently to an American Hospital, and 48 hours later the onset of gangrene made amputation essential. Before doing this Captain F. E. Stinchfield (USA) exposed the entire length of the vessel and found no pulsation whatsoever until the 3rd portion of the axillary artery was identified.

The entire collateral circulation of this arm, including the profunda brachii, must have been unable to obtain any blood from the main vessel stream.

At other times the collaterals themselves may be lacerated—as the next case suggests:

An airman with a badly comminuted supracondylar fracture was admitted to hospital 16 hours after his injury with evidence of impending gangrene. The radial and ulnar pulses were absent. The surgeon who explored the brachial artery found it to be reduced just below the fracture to thread-like proportions. Perfect fracture reduction and local 'Novocain' injection made no difference. Arteriectomy was performed but there was no recovery; gangrene progressed and amputation had to be performed.

Spasm or ligature of the brachial artery should not by itself cause gangrene. In the last war, in a series of 200 brachial artery injuries—many with other serious complications—Makins (1922) records that only 8 developed gangrene. Sencert (1918) regarded its ligature as being without risk to the limb. In the airman's case, therefore, it is likely that the collateral circulation was directly and completely destroyed at the time of the fracture. This fact has to be carefully weighed in the decision whether to do an arteriectomy for the major-vessel spasm. The body is, of course, capable of repairing such collateral vessel damage—but it requires time. By slowing up cell metabolism by rest and cold, the life of the muscle can be prolonged, how much we don't yet know. In the meantime, the collateral vessels, via a mesh of capillaries, join up. But any hæmatoma formation between the vessel-ends acts as a barrier. The difference an arterial hæmatoma makes is shown by Sencert's figures: in 20 "dangerous" arterial injuries—that is, axillary, femoral or popliteal—the limb-mortality rose from 3 to 30%. It is like the hæmatoma under the skin-graft that bars the union of the vessels.

* Hunterian lecture delivered before the Royal College of Surgeons of England on April 16, 1943.

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RÔLE OF THE SYMPATHETIC SYSTEM

What is the rôle of the peri-arterial nerve plexus, and of the sympathetic system in this problem? Leriche (1939) proposed, and it has come to be generally accepted, that trauma excites a local reflex. He claims that the vessel itself has a special intrinsic mechanism for the maintenance of automatic function. He quotes the work of Stohr (1937) and Dolgo-Saburoff (1936) for anatomical evidence of an intramural nervous apparatus containing ganglion cells, and that long and short reflexes may develop on this network. In this complex problem of sympathetic reflexes, the surgeon has to be guided by the physiologist. The ganglion cells Woollard (1926) certainly couldn't find; Le Gros Clark (1939) is definite that they do not exist and he thinks connective tissue cells (e.g., Rouget cells) have been mistaken by some observers for ganglion cells. An afferent arc for any reflexes via the sympathetic ganglia has not yet been found. Stopford (1931) was unable to find it anatomically. Langley was unable to obtain any evidence of true reflexes, and Bard (1941) says "There is no convincing evidence of any such arrangement." These facts appear definite, and it is odd that the attitude "It's there, but not yet been found," should continue. Besides this, there is much clinical evidence against a reflex mechanism. It is utterly impossible to explain by any local reflex why spasm should last sometimes 20 minutes, sometimes 1 hour, sometimes 3, 4, 6 hours, sometimes 24 hours, and sometimes days; and why it should be unremitting even while the limb is dying. We know that all nerve conduction ceases with any full ischæmia after 15–30 minutes. If spasm was induced by a local reflex, or even via ascending afferents, novocain, which abolishes all nerve conduction, should always and immediately release the spasm if infiltrated around the vessel. It doesn't. If the spasm of the major vessel is maintained via the sympathetic ganglia, a sympathetic-nerve-ganglia block should immediately release it. There are few clinical records of this procedure. Professor Seddon (1942) has found that it failed in a case of brachial artery spasm. In the leg paravertebral block has been followed by return of the pulse some hours later (Homans 1943), or the next day (Foisie 1942)—an impossible type of reflex. If the reflex was via a central synapse, spasm should certainly go in an amputated limb. Yet one can find the spasm persisting in the amputated limb (personal collected cases). Neither deep anæsthesia nor spinal anæsthesia, which block sympathetic tone, will in my experience release major-vessel spasm. Spasm may even be induced in the vessel while the surgeon is operating with the patient under spinal anæsthesia, according to Learmonth (1943), Griffiths (1943) and Lake (1943).

There are of course local vascular reflexes, but these are mainly connected with the skin, which having constantly to face injury needs such a mechanism. The sympathetic system of the limb is probably best viewed as an effector mechanism—one of a number—for controlling the circulation. The sympathetic supply to the deeper vessels, compared with that to the skin and superficial structures, is relatively poor. The deeper vessel nerve-fibres often appear to be as functionless as the large amount of unused muscle of the major vessel. But in states of emergency, such as shock or asphyxia, such smooth-muscle contraction comes into its own.

It has become customary to regard the sympathetic as having an adverse influence on the return of the circulation after vessel ligature, in that it holds the collaterals in so-called spasm. The sympathetic system is said to keep the limb cold, and "physiological" release by plexus block or sympathectomy has therefore been urged. It is important to discuss this view, for it enters largely into the treatment of the limb with the vessel in spasm. Considerable evidence is accumulating, as Freeman and Grodins (1941) point out in a review of the peripheral circulation, that the circulation to skin and muscle may be independently regulated; that changes occur in the skin with opposite or no changes in the muscle. Friedlander and his associates (1940) observed that neither paravertebral block, spinal anæsthesia, nor reflex heat dilatation, increased the muscle circulation, though they always increase that to the skin. Kunkel and Stead (1938) in a study of peripheral vascular diseases have pointed out, also, that a normal blood-flow to the foot does not rule out an inadequate circulation to the muscles of the calf. The sympathetic system by its control of the cutaneous circulation is of great importance, I think, in the anæmic limb, for it prevents the pooling of blood in a relatively unimportant area. The trauma that injures the vessel may sever or damage the main peripheral nerves—and therein the sympathetic fibres. The cutaneous dilatation that follows this vasomotor paralysis may not be without danger, and may be the determining cause of the underlying muscle death—the Volkmann lesion. Putti reported in 1938 that he had to operate on 44 nerve lesions in 58 Volkmann's cases. Thomas in 1909, reviewing Volkmann's contracture, reported nerve lesions in 60% of 107 cases. Griffiths (1940) reported that 10 out of 13 of the severe Volkmann cases in his series had lesions of the peripheral nerves. From experience in the last war, Makins (1922) reported that injury to nerves, especially the median in the upper extremity and the internal popliteal in the lower, favoured gangrene. We thus see that the cold limb, said to be due to spasm of the arterial collateral circulation, is in fact a protective measure, and to dilate the skin vessels by forced heating or sympathectomy may not be helpful (fig. 1). What avail if we save the skin and lose the muscles?

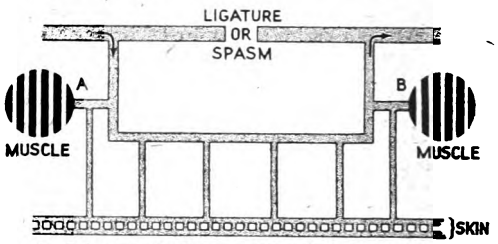

Fig. 1—Collateral circulation. Major branch distributes small branches to the skin until it reaches distal group of muscles (B). The amount of blood reaching these muscles will depend on total cross-section of these vessels. The vessels to the skin may be minute but the sum total of them opened will result in a major leak. To dilate these vessels by reflex heat vasodilatation or sympathectomy may therefore starve the distal muscles of their blood.

ARTERECTOMY

The idea that a damaged segment of a vessel holds the collateral circulation in reflex spasm was first suggested by Leriche in 1917. He advocated excision of a segment—arterectomy. If an arterectomy cuts the reflex arc, then there should be a dramatic immediate return of the circulation. This doesn't happen. What sort of "reflex" is it that takes days to act? H. O. Clark reports 2 days delay before the warmth of circulation, not the pulse, returned after posterior tibial arterectomy; W. Park 2 hours after arterectomy of the axillary, 2nd part; D. L. Griffiths 15 minutes and A. R. Murray several hours, after brachial arterectomy; S. Wass, after a common femoral arterectomy, 2 days (personal communications 1943). Only in the arterial or arteriovenous aneurysm may arterectomy be followed by immediate return of the pulse, and here presumably the collateral circulation is already well established. It is reasonable to expect that procaine hydrochloride spilling around the damaged vessel would release the hypothetical collateral grip. This has been done in many reported and personal collected cases and has almost always failed. The procaine spilling does, however, block the local major nerve—e.g., the median. This will lead to cutaneous vessel dilatation, and the skin warmth may give the impression that the deep vascular supply has fully returned. Contusion or severe damage of the nerve may have the same effect. I think arterectomy is of value—but for reasons different from the reflex theory. There may be blood-clot filling the vessel lumen, either under the site of the spasm or proximal to and beyond it (fig. 2). This is a state of affairs similar to that following an embolus, where it is so important to remove the secondary clot which often extends right down the limb. The trauma that initiates the spasm may damage the intima; this will be the starting-point of thrombosis, and later of secondary clot formation. If the damage is severe the muscle cells too suffer, and the vessel cannot go into spasm, or only feebly. Large clot formation under the site of injury is then favoured. This is to be especially suspected, I learn from the cases, when the pulsation is

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weak. It is important to remember that in any ruptured major vessel the distal end often contains blood-clot—and the distal end should be inspected before clamp ligature. During the last war this risk of thrombosis and obliteration of the lumen was well recognised, and Makins (1922) advocated that any large vessel obviously contused and apparently thrombosed should be locally excised. Such severely contused vessels don't go into spasm, for the muscle cells are destroyed. As Makins has shown, it is subsequent separation of this "dead area" that later results in secondary hæmorrhage or a traumatic aneurysm.

Whether a small local contusion can act as a source of irritation and maintain a state of spasm, I don't yet know. Griffiths (1940) thinks it can and has done local brachial arterectomy on two such cases where there was extensive spasm; this was followed by full recovery of the limb. I am inclined to think the spasm was initiated by the original traumatic force, and the local contusion is but part of the "biff." I think a particular type of stimulus is required to initiate the spasm. Leveuf (1938) has operated on two cases with arterial contusion —and yet no spasm. I have operated on one such case.

If a small contusion can cause arterial spasm, we should expect the crushing ligature or the contusion of the recently sutured vessel to maintain long spasm of the distal vessel. At times this may happen, but I think the spasm is then due to the traction on the vessel rather than the ligature. Such traction, though slight, is often unavoidable—for example, in dissecting out an adherent arterial aneurysm. I am grateful to Professor Seddon for a case which I think suggests this distal vessel spasm:

He excised a popliteal aneurysm with over a year's history, in which Hunterian ligature had been done before admission under his care. The collateral circulation was presumably already established. Operation was under a tourniquet. Skin temperature records showed that when the tourniquet was taken off the foot stayed at 23° C. (room temperature 18° C.) for 19 minutes and then warmed up rapidly.

Richards and Learmonth (1942) have published a similar case:

This was also a popliteal aneurysm, but Professor Learmonth had done a sympathectomy 3 weeks before excising the aneurysmal sac. The operation was also under a tourniquet with a spinal anæsthetic. Records of skin temperature showed no rise for 5 hours after operation, and then the temperature rose rapidly.

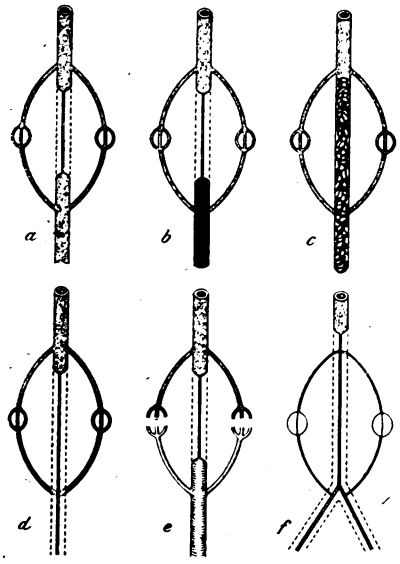

Fig. 2—What may happen to the vessel in spasm: (a) Spasm; collaterals functioning; satisfactory flow. (b) The vessel in spasm but distal clot. The collaterals have no distributing channel. (c) Organisation of the clot to proximal branch. The collaterals now empty into small channels in the vessels traversing the organised clot; this results in a weak pulse. (d) Distal vessel-spasm following (say) vessel traction; collaterals have no distributing channel. (e) Arterial spasm, laceration of the collaterals. Blood-clot will prevent their repair. (f) Arterial spasm involving the origin of collaterals. No distal blood-flow.

Here, too, the collateral circulation had had time to develop, and both the sympathectomy and the spinal anæsthesia should have released any vasoconstrictor influences. The case is further evidence that the distal major-vessel spasm accounts for the delayed rise in temperature.

The contusion of a sutured vessel does sometimes seem to maintain the vessel in spasm. Griffiths (1938) has commented on the slow return of the pulse after embolectomy. This is especially noted after operation on the larger vessels, such as the femoral, where strong traction is often applied by slings to arrest the distal propagation of clot. It is this traction I believe that initiates the spasm. In the simpler embolectomies, as in the brachial artery, where no strong traction is necessary, the full circulation returns immediately. Perhaps the moral of all this is that when the major vessel has to be divided and tied, as little dissection, stripping and pulling as possible should be done, and from what we know of spasm a strong pull by artery forceps to deliver the vessel should be avoided.

GENERAL CONDITION AND SPASM RELEASE

John Hunter regarded an artery as a "supplementary heart." It can be influenced, therefore, in many ways, and the release of local spasm depends on general factors, such as shock. I am indebted to Dr. E. G. L. Bywaters for a remarkable case illustrating a major-vessel contraction or spasm in the shock state.

A patient in poor condition after a crushing injury, due to trapping of the right arm and right leg, complained that the left arm had gone suddenly numb, and the pulse disappeared from this limb. Shortly afterwards the left leg suddenly became numb and the pulse here disappeared; the patient died, and at autopsy no arterial damage was found in any of these limb vessels.

John Hunter was also interested in the problem of what happens to the major vessels in hæmorrhage shock. He exposed the carotid and crural arteries—I think the subject was his famous ass—and then allowed the animal to bleed to death; the major arteries he observed "became smaller and smaller." During the last war it was well known that shock-producing factors, such as pain, fatigue, dehydration and exposure to wet, favoured the onset of gangrene. At times, the general condition—that is, vasoconstrictive shock—appears to determine the onset of a Volkmann lesion. Surgeon Commander J. A. Shepherd (1943) has published recently such a case. C. H. Cullen (personal communication) has observed a Volkmann lesion develop within 12 hours after a simple fracture of the shaft of the humerus in a patient shocked by other associated multiple injuries; and I have collected other similar cases.

In a rather different type of shock—that from burns—the skin, vasodilatation may shunt the muscle blood and determine the onset of the Volkmann lesion. The following case suggests this march of events:

A sailor received second-degree bomb-flash burns, and at the same time sustained a simple fracture of the radius. When he arrived at hospital the œdema was already established. He was cleaned up and the burns were silvered. A padded plaster—a mere shell—was applied to the forearm. Later he complained of severe pain in that limb, and as the plaster was loose the pain was regarded as due to the burn. The pulse was not then noted. By the 4th day he obviously had a Volkmann's contracture and the pulse was then fully present (Cohen 1941).

This effect of the vasodilatation of burns on the musculature needs further observation.

SPECIAL FEATURES OF VASCULAR SPASM

Duration of spasm.—A major vessel may remain in spasm for a variable period; 20 minutes, 1 hour, 4, 6, 17 and 24 hours, are times in my collected cases. The spasm can persist even unto the death of the limb. Surgeons have often said to me, "Surely if the limb is dying the artery will die and the spasm will release itself." But plain muscle, as I have indicated, needs very little oxygen and the artery survives for some time after the rest of the limb is dead. I am not yet certain, but from clinical cases it seems to me that such clam-like spasm will relax on the 3rd or 4th day. John Hunter did a simple but striking experiment on this question. He observed the vessels of the cord of a detached placenta. Daily he ligatured and cut off segments. The vessels remained contracted till the 3rd day when the vessel mouths were seen to have opened slightly. On the 4th day they were completely open. The experiment shows that spasm may be maintained for 3 or 4 days after the circulation has ceased.

The extent of vessel closure in arterial spasm varies. Sometimes the vessel is completely closed. This is especially the case where spasm has followed the impingement of a fracture fragment or the application of a

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tight tourniquet. In the "crushing injury" cases that followed limb trapping (in some of the air-raid casualties), Bywaters, et al. (1942) found that an intense arterial spasm was the commonest cause of the limb ischæmia. As a rule there was no evidence of damage to the main arteries of the limb, though some of the smaller arteries were thrombosed. The persistence of this spasm even after rapid freeing of the victim is regarded as responsible for the subsequent muscle death. According to Bywaters (1942) it is the autolysis of this dead muscle that determines the ultimate renal failure. At other times the vessel lumen appears to be merely narrowed, not sufficiently to interfere with the distal blood-supply. This is especially so in the spasm that follows a "near miss" of the vessel.

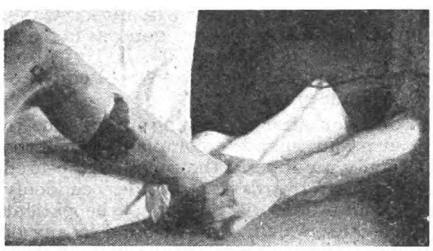

Fig. 3—Black patch of dry skin gangrene, quite often seen in air-raid casualties; apparently due to being hit by flying debris.

Pain in arterial spasm.—It is natural to picture a local agonal state of the vessel as painful, but a striking feature of some of the cases, especially those with war injuries, is the absence of pain. The work of Lewis, Pickering and Rothschild (1929), and Lewis (1942), has shown that in arterial ischæmia the pain is an expression of muscle cramp. If the limb muscles are working hard at the moment of obstruction, the onset of exquisite pain is immediate. The limb at rest merely feels numb. A sensation of cold, of the limb being dead, is often complained of rather than pain, especially in cases of fracture spasm. Some of the spasm cases I have noted have paroxysms of pain, rather like an intussuception.

Arteriovenous spasm.—It has been suggested that venous trauma or thrombosis may cause reflex arterial spasm. I have searched for cases where a traumatic venous injury or thrombosis could be said to have definitely caused limb damage by producing reflex arterial spasm, but I have not come across one. But I have found a case where thrombosis was present and yet there was no arterial spasm. In an air-raid casualty that died 14 days afterwards, I found an unsuspected thrombosis of the posterior tibial vein with normal artery. During life there had been no indication of any arterial spasm or damage (figs. 3 and 4).

Suppression of hæmorrhage and arterial spasm.—What is the stimulus to muscle contraction when the vessel is divided? Is it the direct trauma of the cutting knife? I don't think so. We know that in a lateral wall opening or an embolectomy arterial spasm does not follow. The smooth muscle of bowel doesn't respond to cutting, but requires a definite type of impulse—distension—to make it contract. So the vessel. I believe it is the sudden elastic recoil of the divided vessel that acts as the stimulus, by altering suddenly the length of the muscle-fibres. That the vessel is in a state of longitudinal elastic stretch is well shown by the large gap, 1½ in. to 2 in. or more, that appears when say the femoral artery is divided. If such a vessel be divided and the adventitia remains attached, or there is a strand of vessel wall still holding, the vessel cannot fully recoil, and as Makins (1919) and Sencert (1918) have observed, hæmorrhage will continue. Again, a vessel divided at or near its anchoring branches cannot fully recoil, and this type of injury continues to bleed. Makins (1919) has pointed out this tethering effect of the axillary circumflex vessels, the popliteal genicular branches and the gluteal artery branches. When an artery is divided by a blunt object—lacerated—there is often less bleeding; one reason is that the lateral displacement of the vessel by the blunt instrument stretches it in length before division takes place and is a stronger stimulus to spasm contraction. The longitudinal elastic recoil of a vessel is actually so strong that it enlarges and pulls apart the edges of a punctured transverse wound, which therefore bleeds more freely. A longitudinal wound on the other hand doesn't divide the elastic fibres across, so that suturing is more possible. The spasm that follows division of a vessel seldom affects more than about an inch of the vessel. It is indeed a remarkable mechanism whereby the elasticity of the vessel which speeds the blood-flow, initiates the impulse that seals the flow when the vessel is severed.

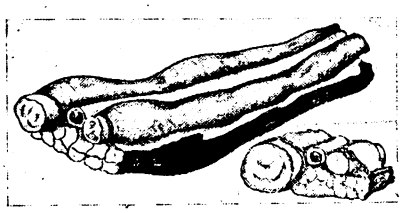

Fig. 4—Exploration of posterior tibial vessels deep to gangrene: thrombosis of both veins (the clot can be seen protruding); normal arterial vessel, confirmed on section. No indication of arterial spasm during life. Same case as fig. 3.

Tourniquets and arterial spasm.—Considering the enormous number of operations being regularly performed under tourniquets, especially by orthopædic surgeons, tourniquet arterial spasm is indeed rare. I have made extensive inquiries from the leading orthopædic surgeons in this country and have only been able to collect 4 such cases There are plenty of complaints about the misuse of the tourniquet, its unnecessary use in first-aid and its malapplication; there is the "forgotten" tourniquet, and nerve damage from pressure is sometimes seen, but vascular spasm complications are hardly ever encountered. Experimental workers have been unable to produce arterial spasm with the soft rubber tourniquet. Wilson and Roome (1936), experimenting on dogs, applied tight rubber tubing tourniquets around the level of the hip-joint for several hours; radiopaque injection subsequently showed no arterial spasm. Barnes and Trueta (1942), using a very tight wire tourniquet held for 4½ hours, have produced arterial spasm in the rabbit. They have published some striking radiopaque pictures of this spasm.

Fig. 5—Gangrene of hand following the application of a tight Esmarch tourniquet at the lower axillary margin for 45 minutes. The radial pulse returned on the 3rd day. (Cohen 1941.)

The main artery of a limb is well cushioned off, especially in the thigh, by the muscles. Where the vessel in tourniquet-spasm has been exposed by operation no vessel damage has been found (2 cases—Griffiths; personal communication). Trueta and Barnes in their experimental work found the vessels uninjured. Besides, the circumferential squeezing type of compression of the tourniquet is not the particular type of stimulus that initiates arterial spasm. Tourniquet-spasm is initiated by the brutal experimental tight type of constriction (fig. 5). I suggest to you that arterial spasm following the tourniquet is entirely different from the myogenic type of arterial spasm which we have been mainly discussing. It is a shock response. The reflex arc starts probably in the skin, or deeper tissues, and the sympathetic system serves as the efferent vasoconstrictor mechanism. It is not the length of time that the tourniquet is on that induces spasm—for operating with the patient under refrigeration anæsthesia I have kept on the tourniquet for 4½ and 3½ hour periods and there was no subsequent vessel spasm. Allen et al. (1942) has kept it on in the human for 6 hours—also with no subsequent arterial pathology. The fact that the opposite limb was also involved in spasm, as in Barnes and Trueta's experimental work, must mean that the reflex has to travel via the spinal cord. This type of spasm thus falls into line with the experimental work of O'Shaughnessy and Slome (1935) on the nervous factor in a particular type of shock—that following fracture of the femur—where they were able to prevent shock by major nerve section or spinal anæsthesia. No special comment was made by them on the state of the vessels. Trueta and Barnes have been able experimentally to release, but not completely, tourniquet arterial spasm by sympathetic ganglionectomy. Novocain-block of the major nerves may be

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an advantage as it will deal with the afferent impulses, and at the same time block the sympathetic vaso-constrictor fibres. This therefore seems to be rational therapy.

FRACTURE AND ARTERIAL SPASM

In discussing this problem with numerous general surgeons and orthopædic surgeons I find that, some time or another, nearly all have had such cases. My orthopædic colleagues tell me they quite often observe absence of pulse for 20 minutes or an hour after fracture manipulations. The importance of arterial spasm in connexion with Volkmann's contracture was ably dealt with by Griffiths in an Hunterian lecture in 1940. He showed that arterial injury was the cause of the lesion, and he indicated the importance of exploring such cases. In the leg, Volkmann's contracture is often missed; it nearly always necessitates amputation. In a crushing injury, therefore, with many hours' history of lower limb pinning and almost certain muscle death in that time, due to the prolonged intense arterial spasm, the surgeon should amputate the limb early, rather than pursue conservative treatment and risk the patient's life.

The extent of the vessel spasm with a fracture varies. With a fractured humerus it may go up to the axilla and usually reaches the coracobrachialis insertion. With a fractured femur it may extend up to the lower part of Scarpa's triangle. As a rule the profunda femoris and the profunda brachii escape. Arterial spasm is known to have followed fracture of every one of the long bones. I have been unable to find any cases of hand or foot injuries followed by proximal arterial spasm, and since these are unlikely to stretch the proximal vessels, we should not expect to find such spasm.

I have collected 2 cases where arterial spasm followed shoulder dislocation. In both the spasm occupied the 2nd part of the axillary artery—from the acromiothoracic branch to the subscapular artery. In one case Mr. K. O. Parsons of Birmingham said the vessel looked so small that when he first exposed it he thought it had been torn and there was merely a connecting strand of adventitia. In the other case Mr. W. Park found a well-marked contracture, about 1 in. long in the middle of the second part; below it the artery looked normal though slightly contracted. Arterectomies were done in both cases a few hours after injury, and in both the circulation fully recovered.

More observations are needed in cases of doubtful vascular injuries—for in the warm limb the fate of the muscle appears to be decided within 6–12 hours; in cold conditions it may remain viable much longer after circulatory arrest. A warm limb does not necessarily mean that the circulation is good, for in a warm bed it takes many hours for that limb to cool down—even up to 20 hours. Plaster should not be used if vessel damage is suspected—it is easy to compress the collaterals over the bony points. Splitting the plaster when it is suspected to be too tight is often not enough to prevent the case progressing to gangrene. With a serious vascular obstruction there is a loss of motor power within 15–30 minutes, and inability to move the toes is often a reliable signal that the plaster is too tight. I suggest the use in such cases of a Thomas splint with slight skeletal traction when necessary to fix the fracture. I say slight traction because often a mechanical cause rather than arterial spasm is maintaining the circulatory obstruction; one may find the vessel kinked over a fracture end or trapped between the bone ends. In reducing a fracture the surgeon has to remember that the repeated manipulations may lash the vessel and start the spasm. We know that the onset of gas gangrene will be favoured by a poor blood-supply, and that such gas gangrene rarely starts after 48 hours. So in areas where there is much muscle, such as the calf, shoulder and thigh, it may be advisable to be content with imperfect bone position for the first few days.

SEGMENTARY ARTERIAL SPASM AFTER GUNSHOT WOUNDS

The following case illustrates some of the clinical features.

A medical orderly attached to an adjacent hospital was injured at his elbow-joint by a bomb fragment. He was not shocked, but the radial and ulnar pulses were absent on the injured limb; 6½ hours later he came to operation. During all this time the pulse had not returned. Complete brachial artery division was suspected. As I was anxious to preserve the collaterals a blood-pressure tourniquet was applied. The wound was excised and the vessel cleared. No periarterial sympathectomy was done, but mere cleansing of cellular tissue. A bruise was observed over the lower end of the brachial artery. The tourniquet was now released, and immediately it was noted that the radial pulse had fully returned (Cohen 1941).

The history of other recorded cases is similar. There is no question of obstruction or pressure by a hæmatoma. Hot serum and saline applied locally with freeing of the vessel have in some cases restored the circulation—in some they haven't. Kuttner and Baruch (1920) have observed a very small pulse-wave passing through the contracted part. There is no evidence in these cases that the collateral circulation is also held in spasm. The extent of this type of spasm is usually about an inch, sometimes up to 2 in. The details in the recorded cases are incomplete, but after mere exploration the pulsation appears to have returned sometimes at once, sometimes in 3 to 4 hours, and usually within 24 hours. The pulse may return for a short time and then disappear again; or it may return and be weak for 24 hours, and then become full again. From reported cases this type of spasm seems to be innocuous, though bad results are seldom published. I would advise early exploration, because no-one can be certain whether an absent pulse is due to division, thrombosis or spasm of the vessel. Exploration will enable an arterectomy to be done if the vessel is contused or contains clot. If the vessel wall appears normal, I would say apply local warmth, don't do a periarterial sympathectomy, because this procedure may even prolong the spasm. An arterectomy is inadvisable if the local tissue damage is extensive. It may finally seal the fate of the limb.

MANAGEMENT OF THE ANÆMIC LIMB

All local measures come to naught if the general condition is not attended to. Matas (1940) has well said that in the cold, dehydrated, exhausted, exsanguinated soldier, anything else is but a therapeutic parody. Blood-transfusions given early, rapidly and in massive amounts are essential. Rest for the limb is important, for the nutritional needs of resting muscle are small. Morphine assists this by allaying restlessness and damping down the cell metabolism. The anæmic limb should not be allowed to wallow unsupported in the bed. Immobilisation, besides limiting infection, will limit absorption. It will keep the temperature down and thus minimise the surface vasodilatation. The limb should be elevated. It does not, as has been suggested, empty the arterial tree and cause capillary anoxia. McDowall (1938) brings evidence to show that in man there is a well-developed vasoconstrictive mechanism to prevent blood accumulating in the dependent parts. In the erect attitude he shows that the volume of blood flowing from the lower limbs may be reduced by 50%. As far back as 1895 Oliver showed this reduction in size of the radial artery. Proger and Dexter (1934) and Yeomans, Akeroyd and Frank (1935) have also demonstrated the decrease in the volume and velocity of the leg circulation in the dependent limb. Elevation does empty the veins, but as Professor Bazett (1941) observes, the reduction in bore of the collapsed veins increases the resistance to capillary flow, and it is found that the peripheral venous and capillary pressures are thus maintained "close to their normal values." Elevation by diminishing venous pressure and increasing lymph flow prevents œdema which will compress the capillaries. I have already shown how important these are in the formation of the new arterioles in the obstructed main blood-flow. It is not sufficient merely to elevate on pillows, the splint must be deliberately suspended.

To force the collateral circulation regular immersion of the unaffected limb in hot water has been advocated. I don't think this advisable in the early stages; for if the superficial vessels are dilated, the deeper muscle circulation will suffer. For the first 72 hours, I think ice-bags suspended over the limb to keep it cool are indicated. I say 72 hours because with the reduced cell metabolism with cold, the skin is well able to withstand

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cooling for as long as this. Where I have amputated by the refrigeration method of anæsthesia of Allen (1941, 1942), even 4 days of ice-bags has not interfered with skin healing. By keeping the limb cool we merely mimic nature, for when a tourniquet is applied the exposed limb cools to about room temperature—say 15–20° C. Lake (1942), who did excellent work on this subject in the last war, has shown that below 15° C. cell metabolism becomes so much reduced that katabolism practically ceases, and life can be maintained in this state for a long time. Cooling thus enables life to be maintained while the collateral circulation is being established and repaired, a much more rapid process than we suppose. I have not recommended keeping the limb completely enclosed in ice, for that will interfere with fibrin formation and the whole process of repair; certainly icing of the skin edges of the amputation stump will prevent the edges gluing together. Cold does not appear to induce arterial spasm in the deeper vessels in these cases. I have observed in 4 cases of amputation with refrigeration that when the tourniquet is removed there is free bleeding from the cut muscle, but the skin vessels do not bleed. The vessels well below the tourniquet pulsate freely. Allen and his colleagues (1942), too, have carefully examined the vessels in well over 50 cases amputated under refrigeration and report no abnormality. The fact that the deeper-than-skin vessels are not affected may be of great importance in the air-raid "crushing injury," where there is intense arterial spasm akin to that produced by the crushing tourniquet. I have already suggested that this is a shock response. If the local tissues are kept cold until the circulation returns, the chances of muscle survival are considerably increased, and muscle autolysis and renal sequelæ may thus be averted. If the patient is trapped for many hours before admission, the fate of the muscle will already have been decided. Blalock and Duncan (1942) show experimentally that if a limb is enclosed in a tight press (to mimic the trapping conditions) for 5 hours, and is kept iced during this period, the animals nearly all suryive, and the subsequent renal and blood-pressure changes are minimal. If the ice is applied after the 5 hours crushing, all the animals die. These findings may have important applications in the treatment of crushing injury. For the ordinary anæmic limb, cooling rather than icing is indicated for the reasons of repair. John Hunter summed it all up when he said, "Cold debilitates or lessons power when carried too far, but at first lessens action."

SUMMARY

This broad survey of arterial spasm is based on 120 collected and personal arterial incidents, in most of which spasm was a feature, and experience with air-raid casualties running into four figures. I have avoided going too much into details because as Montaigne says, "Whatsoever is sliced into very powder is confused."

The peculiar responses depend on the natural contractile properties of the smooth muscle of the arterial wall. A particular type of stimulus—lash of the vessel—is required to initiate spasm. There is need to review our attitude that on ligature of a main vessel, it is pathological cramp of the collaterals which is responsible for the death of the limb. The fate of the limb is often determined by the extent to which the collaterals are damaged, and hæmatoma formation may prevent collateral repair.

The sympathetic system is not concerned in the local spasm of the main artery, but by keeping the cutaneous circulation closed the sympathetic system prevents the blood pooling in the relatively unimportant skin areas and so starving the muscles. Thus where the sympathetic fibres are destroyed, as in associated nerve injuries, the onset of a Volkmann lesion may be favoured. The muscle circulation cannot be assessed from observation of the skin circulation.

The operation of arterectomy has no reflex effect in cases of arterial spasm—it may be of value, but purely for mechanical reasons, such as removal of clot or of a contused segment of the vessel in which clot is likely to form. A local arterial bruise does not by itself act as an irritant focus and maintain spasm—this was initiated by the original blow. Pulling on the distal half of a vessel during ligature or embolectomy may initiate a spasm lasting varying times. Venous trauma is unlikely to cause reflex arterial spasm. Hæmorrhage from a divided vessel is checked by the spasm induced by the stimulus of the elastic recoil of the vessel. When this recoil is prevented contraction is defective.

Tourniquet spasm, and the allied condition following crushing injury, is of an entirely different type—a shock response—and, for this, nerve-block and icing of the limb till the circulation is restored are advocated.

In the arterial spasm following fracture early operation is needed, and repeated manipulations during the first 48 hours are to be avoided.

Segmentary (military) spasm is regarded as innocuous, but exploration is advisable because the state of the vessel cannot otherwise be determined.

In the management of the anæmic limb elevation is important. The limb should be kept cool, not iced. Icing is reserved for the crushing injury. Spasm of the deep vessel is not induced by refrigeration of the limb. Attention to the patient's general condition is the primary consideration.

A large number of surgeons sorted out, or discussed with me, their cases of vascular injury. It is impossible to acknowledge adequately, in detail, their great help.

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"... I declare that 10 million French people in the towns are suffering from slow starvation, that 2 million of them are liable to succumb to starvation either indirectly as a result of contracting infectious diseases or directly. The most serious shortage is that of fats. Townspeople are eating four times less fats than before the war. In the present state of affairs, the only practical method for ensuring the feeding of the French population both rural and urban consists in developing the cultivation of oleaginous plants."—Prof. CHARLES RICHET. *Bulletin de l'ordre des Médecins de France*; quoted by *Méd. et Hyg., Geneva.* Sept. 15, 1943.

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REACTIVE ANXIETY AND ITS TREATMENT

GERALD GARMANY, M B MANC, D P M
NEUROPSYCHIATRIC SPECIALIST RNVR

NAVAL personnel have been exposed, during the first three years of the present conflict, to stress of a sustained and sometimes exceptional kind. Many men have passed through all the major campaigns in Norway, France, Greece and Crete; some have been survivors repeatedly or have been wounded and adrift in open boats for days; and many have sustained the stress of long and lonely patrols, minesweeping, and raider-hunting. The lesson of experience of these men is one far removed from gloomy despondency and displays very clearly what underestimation of nervous capacity there has sometimes been in the past.

This paper is based on outpatient work in a large Naval depot. Most cases were recent—newly joined, constitutional neurotics awaiting their first draft to sea, recent survivors, and men feeling unable to continue after a long period of stress. These cases have all been examined, treated in depot, finally assessed and their subsequent drafts noted. A man failing to adjust to his draft is returned to depot and back to the psychiatrist, a system which effectively restrains prognostic optimism. A close liaison with the psychiatrists at the Naval hospital near by is maintained and cases discharged from there are taken over for any further treatment and for eventual disposal. Treatment is outpatient in type; cases are a minute percentage of the healthy men in depot awaiting draft, and they perform full duties in depot, not being distinguished in any way from their fellows except that, on the average they attend the psychiatrist once a week; on completion of treatment they are made fit for sea service or shore service, or are invalided.

NATURE OF ANXIETY

The sustained and conscious tension of reactive anxiety may occur in diffuse form, so that anxiety or a psychic equivalent is experienced and complained of as an entity, together with irritability or depression, or at times depersonalisation. "Tight band" headaches, tremor, fatiguability, insomnia and loss of weight are almost constant symptoms. It is the custom in the Navy, wherever possible to obtain, unknown to the patient, a confidential report from an officer with whom he has served, giving information about the man along prescribed lines. Such independent accounts are of great value: they have emphasised the importance particularly, of behaviour change as shown by obvious irritability and morose solitariness.

The pathogenesis of local symptoms can usually be traced to one of three origins—a constitutional predisposition as shown, for example, by a family incidence of gastric disorder, an acquired tendency derived from group experience, or merely to a common psychosomatic relationship such as the "sinking feeling" of fear. Family or group tradition and example are important factors modifying these tendencies and it is an interesting fact that comparatively few men in the Navy report sick with seasickness, which is certainly not an indication of its infrequency but rather of the Naval or group attitude in respect of the affliction. The commonest types of localisation of symptoms are found in the cardiorespiratory system, as inframammary pain, dyspnœa of effort, palpitations and tightness of the chest; in the alimentary system as flatulence, discomfort, acid risings and diarrhœa; and genito-urinary complaints include frequency and prostatorrhœa. Sudden panic-like exacerbations, or anxiety attacks, may either be superimposed, or arise as isolated episodes in a patient showing little in the way of manifest anxiety in the intervening periods. They are often seen in anxiety of recent onset and are predominantly somatic in character with palpitations, urgency of micturition, nausea, a feeling of choking and dizziness. A desire to flee or an inability to move may be present, together with a sensation of intense fear and consciousness of impending disaster.

FACTORS IN INCAPACITATION

That a man has reached a stage when he can no longer continue his work in unmodified form is sometimes a decision reached by himself. Most commonly however the deciding factor is provided by the influence of an observer. A certain number of cases are referred by divisional officers or chaplains, and a considerable proportion are made to report sick by leading hands or petty officers who observe unusual behaviour or report that a man is useless in action. The value of such independent lay testimony is of course enormous. Another group of considerable dimensions is formed by those whose wives or relatives remark a personality or behaviour change and either induce a man to report sick himself or write letters in expression of their concern. The family "health conscience" or attitude to disability is of tremendous importance, and the medical future of a man who goes on survivor's leave is in very large measure determined by his familial reception. This may take the form of reinforcement and encouragement to endure or may consist of commiseration, and thoughtless excess of sympathy. It is with the threshold of tolerance of anxiety and what we can do to raise its level above the resting value or in those in whom it has fallen, that we are primarily concerned.

These factors briefly surveyed, fall into four groups—signs, symptoms, psychosomatic structure and group-sense. A tremor of the hands in a writer, or functional asthenopia in a coder, may of themselves prove incapacitating. The inability to read, or to react quickly and correctly to verbal orders, in the case of a man of subnormal intellect; repeated punishment for faults ascribable to lack of comprehension; or easy suggestibility to the advice and doctrines of psychopathic shipmates, are all factors in themselves productive of anxiety and represent a big handicap in adjustment to Service life. Far more important are the questions of emotional instability, of dissociative tendencies, and of obsessionalism which impose limits on achievements, and the brevity of their mention here is no index of their importance.

Group-sense, a term chosen with the intention that it might be free from controversial implications, simply means an awareness of, and adherence to, group attitudes and values. Its importance, the essential theme of this paper, lies in the fact that a large proportion of reactive neurosis exhibits a progressive and preventable deterioration of group-sense, and that this deterioration is the chief cause of chronicity of reaction. The individual who, being neither mentally defective nor a victim of chronic pathological anxiety, presents himself complacently to the nearest doctor, soon after conscription, with the bald statement that he is terrified of bombs, guns and salt-water, is fortunately not a common sight but he is known to all. He shows no signs of an anxiety state, and only by a travesty of nomenclature could be described as suffering from this condition. The condition is an indifference to external opinion and a simple, frank refusal to endure danger of any kind. It is a stabilised attitude and not an affective disturbance. The group is small and only important for its illustrative value. At the other end of the scale, a very much larger group, are those men, conveniently alluded to as "of good type" who, by every reasonable judgment, have fought hard against the inroads of an affective illness and who, excluding complicating factors, will respond well to reassurance, symptomatic therapy and rest from stress. Group-sense here is of high order, and the symptoms when capitulation occurs are correspondingly definite and severe. In between, is the main mass of neurotics who present every degree of constitutional limitation, every degree of traumatic experience, every degree of reaction and every level at which incapacitation can develop. Therapy must have its main object in the prevention of deterioration of group-sense during and subsequent to the neurotic illness.

TREATMENT

Methodical sedation, not of a heavy kind, will in most cases clear up physical signs; appetite must be stimulated. With regard to the remainder, every case must be treated on its merits, and the policy pursued makes all the difference in the results obtained. An assessment must be made, in the light of his psychiatric history and his previous performances during the war, of the patient's capabilities if he makes the fullest effort. Clearly it is useless to return a man to sea who under bombardment develops severe anxiety incapacitating on account of its

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signs and symptoms (not the spurious incapacitation due to defect in group-sense), nor is any form of therapy likely to remove his tendency to the reaction in provocative circumstances. He may be suggested or badgered into trying again, but when the issue of the struggle is in no doubt it is a waste of drafting and psychiatric time to send him. He may be perfectly capable of shore service and it is both sensible and more economic to use him where he can remain fit.

The belief that the robust type of man who has reacted with anxiety to a long period of service at sea and much bombardment requires a period of shore service proportional in length to the extent of his stress is completely fallacious. The prognosis in these cases, given the absence of complications, is uniformly good. All that is required is the removal of symptoms and the careful avoidance of implantation of a belief of permanent damage by the therapist. The group-sense of a man like this is in no doubt, in the light of his performance, and it should not be discussed. Indeed it may be strong enough to be an obstacle to therapy and the intolerable sense of inferiority produced by an affective disturbance in robust men may be relieved by the development of a mildly paranoid attitude towards the physician which is best borne in silence because it is short-lived. Honesty must be the basis of all therapy and the patient must realise that his condition differs only quantitatively from normal fear. Genuine misinterpretation when it exists must be dealt with early, or all is lost. In qualification it may be said that there are a few occasions when an economy of truth, not inconsistent with the policy of honesty, is better therapy. With some men a degree of self-deception and permitted repression may be less wounding to the ego, and achieve a cure more quickly, than perfect clarity of insight rigorously demanded. Unjustified self-esteem may be of great assistance in rehabilitation, and should not be attacked indiscriminately.

Transfer of onus is a vital preliminary step. It must be made clear at the beginning of treatment that the responsibility for recovery is the patient's and not the doctor's. The function of the latter is to assist, with medicine and advice, the patient's endeavours to regain his courage. "Are you getting your confidence back" is a far more productive method of approach than one which asks if treatment is doing good. Patients tend to demand—though they do not expect it—the production of an ideal psychosomatic entity which experiences neither anxiety nor pain; and unless it is clear that only an average functional result is expected, patient and therapist will spend months futilely pursuing the unattainable. The therapist must take care not to imply doubts as to the reality of symptoms, but must rather take the line that though he realises their presence he does not regard them as incapacitating and they must be borne.

Patients must be given a clear conception of the nature of their reaction and of the fact that it differs only quantitatively from the physiological apprehension which they had experienced and overcome successfully before. This conception is in fact usually present at the outset, but it is easily destroyed by undiscriminating therapy and it may be the psychiatrist's task to reinstate it. Misinterpreted emotional reaction if it exists—and it has been stressed that it very commonly does not—must be evaluated systematically. If this is undertaken it must be done thoroughly and the therapist has only to ask a few patients to repeat the explanation again a week later to realise what care, thoroughness and reiteration are required to avoid the most extraordinary misinterpretations of his meaning. The art of therapy from then on lies in the stimulation of group-sense by pursuing a middle course between the Scylla of condonement and the Charybdis of disparagement. Condonement of an anxiety reaction is inevitable but condonement of a perpetuated deterioration in group-sense is the chief cause of chronicity.

Disparagement if too overt produces antagonism; if it is absent altogether then no progress will be made. The injection of a mild sense of guilt about the reaction must be an early step and an impression of goodwill and understanding is necessary if this is to be done. Remarks must be simple and confined to the patient's own case with reiterated but implicit emphasis on his own obligation to retain his sense of duty at its former level. Platitudes and generalisations of an elementary kind on which there can be no possible difference of opinion have their value in placing therapist and patient on the same side of the fence. It should be clearly understood that the patient is going to be fit for any draft that comes along in a very short time, and in every respect the patient must be taught to regard a reactive anxiety state, not as a deep endopsychical disturbance which it is not, but as a minor malady.

Symptoms must be treated with vigour. A gross tremulous agitation should be put to bed, and forty-eight hours' sedation has been found in most cases to make discharge to hospital unnecessary. Predormal hypnagogic hallucinosis, anxiety dreams and insomnia must be successfully dealt with if the patient is to believe that the severity of his condition is understood; and if the symptoms feature notably in the history the use of gr. 3 of pentobarbital soluble just before turning in for a week will succeed where gr. 1 of phenobarbitone might fail, with disastrous forfeiture of the patient's faith. He can then be weaned, and it is wise to enlist his coöperation by leaving him the option of trying to sleep without aid if he feels he can do so. This is a wiser course than prophecy, and a suspicion of "tablets" widespread among sailors is a considerable help. The factor above all others which tends to success in the treatment of reactive anxiety is the presence of facilities for retaining the patient at full routine duties, living among other healthy men, greatly diluted by them and indistinguishable from them. The completeness of recovery and return to duty is measured by the brevity of hospital sojourns, and the best occupational therapy for these patients is to be found in a normal day's work. Psychocatharsis and analytical methods in general, except for a small minority, serve no useful purpose and indeed constitute a menace and often a disaster.

RESULTS OF TREATMENT

—	Category A	Shore service		RN hospital	Invalided	Total
		Temp.	Perm.			
Anxiety state	490	681	111	27	33	1342
Hysteria	54	45	17	5	1	122
Psychopathic personality	114	66	..	5	4	189
Post-concussional state	20	42	4	7	1	74
Endogenous depression, Schizophrenia, Paranoid state, Other states	6	15	1	22	5	49
Mental defect	12	19	7	8	28	74
Obsessional states	2	..	..	1	2	5
No abnormality	447	..	..	..	..	447
Totals	1145	868	140	75	74	2302

The table gives the results of 1342 cases drawn from a wide area, over an arbitrary span of time, who were treated and supervised until the time of going on draft. These were patients of variable type with varying degrees of reaction, but were all referred because of affective symptoms. A total of 2302 cases have been included to emphasise the numerical importance of the affective group, and this figure represents the psychiatric material which was seen over the same period of time—organic disease of the central nervous system, migraine and epilepsy have been omitted entirely. Psychopathic personality covers those, both inadequate and aggressive in type, in D. K. Henderson's sense, who were free from affective disorder. Cases of reactive anxiety in which psychopathic features appeared in the history are included under anxiety states. Subnormal intelligence includes the backward, the dull and the feeble-minded, as a primary condition. Those with anxiety symptoms who were found to have poor intelligence as an ætiological factor are included under anxiety states. It may be noted that no effort has been made to separate anxiety from depression of the reactive, as opposed to the endogenous, type.

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Category A implies that the reaction was not considered severe enough to require removal from the category of full duty, except that in some instances reservations as to the size of ships might be made.

Temporary shore service includes those who for periods ranging from one to three months, and in a small proportion an extended period, received outpatient treatment, being then categorised as in category A.

Permanent shore service is fitness for full duties on shore but unfit for draft to sea.

It will be seen that 87·75% (1171 cases out of 1342) were fit to return to sea within a short time, 8·25% required modified service and 4·5% were losses. Only 27 cases out of 1342 or 2% were ill enough to require institutional treatment.

CONCLUSION

From the point of view of fear and of reactions to it, men fall into three classes. The vast majority experience the emotion and continue their tasks despite it, because they possess two attributes: a psychosomatic architecture which permits them to absorb such trauma as can be produced without the development of illness; and group-sense, which makes it worth while to endure. The second class includes those who become incapacitated with signs of somatic derangement at a certain point. The degree of group-sense existing is variable, and it is important to realise that it may be very high indeed. It is common experience to see men of very timorous type who endure great stress without complaint and capitulate only at a late stage when the condition has progressed to one of quite severe bodily illness. Group-sense may be low but it must exist in cases developing fear reactions; those in whom the factor is absent never permitting themselves to be placed—or at least retained—in peril, and they never develop reactive anxiety because they never permit a conflict to arise at all. The problem they present is not a medical one, and they should find no sanctuary with the psychiatrist. It is in the power of the psychiatrist to keep this all-important factor of group-sense at a high level and by an implicit and not over-weighty type of psychogogy, often to raise it. He must at all events prevent its deterioration. The essential thing is to treat the man as a combatant whose normal intermittent periods of fear have merged one into another, so that he is in a continuous state of tension which is pathological not in its intensity but only in its continuity. He must continue to be treated as a combatant and not as a psychopathological curio.

In the class of reactive anxiety proper, with physical signs of psychosomatic disturbance, there is every ground for high prognostic optimism. Early return to duty, and especially early diagnosis with avoidance of time in hospital spent in the investigation of non-existent somatic complaints, are the mainstays of treatment. Discharge from the psychiatrist's department should be arranged soon after the disappearance of physical signs, and long periods of modified duties are to be avoided. Of the greatest importance of all is psychogogic therapy adapted to the needs of the man himself, and the realisation that it is quite small errors in management which make the difference between recovery and chronicity.

SUMMARY

An outline of reactive anxiety of war, and its treatment in a Naval depot has been given.

Results over a period have shown that 1171 (87·7%) out of 1342 cases were returned to full combatant duties.

The importance of early diagnosis and avoidance of institutional treatment have been stressed. The best occupational therapy for these cases lies in full duty in Service surroundings.

It is believed that reactive anxiety of war should be regarded as a condition pathological not in its nature but in its maintenance and continuity. The routine employment of an involved psychotherapeutic approach is to be deprecated.

A careful distinction between the reaction, which constitutes an illness, and that of conscious evasion of social duty is essential.

My thanks are due to Surgeon Captain Desmond Curran, RNVR, for his helpful suggestions, to Surgeon Captain L. F. Strugnell, RN, in whose charge this work has been done, and to the Medical Director-General of the Navy for permission to publish the paper.

CONTROLLED EXTERNAL PRESSURE AND ŒDEMA FORMATION*

R. J. ROSSITER

B SC W. AUSTRALIA, B M, D PHIL OXFD

DEMONSTRATOR, DEPARTMENT OF BIOCHEMISTRY, OXFORD

With a note by

R. A. PETERS, M C, M D CAMB, F R S

PROFESSOR OF BIOCHEMISTRY IN THE UNIVERSITY OF OXFORD

RECENTLY external pressure has been advocated in the treatment of burns. It may be applied either by skin-tight plasters (Roulston 1941, Barnes 1943) or by the pressure dressing now widely used in the United States (Mason 1941, Allen and Koch 1942, Siler 1942, Siler and Reid 1942). Among the advantages claimed is a diminution of local œdema, and hence of plasma loss, during the stage of secondary shock, 2–48 hours after the accident.

Experimentally, Barnes and Trueta (1941) found that application of a skin-tight plaster to the burnt limb of a dog diminished both local swelling and lymph flow. These observations have been confirmed and extended by Glenn, Gilbert and Drinker (1943) in America. Since both groups of workers have shown that this treatment lessens œdema, it seems probable that the hæmoconcentration accompanying the fluid loss is also decreased. The few experimental results purporting to show decrease in hæmoconcentration when the pressure dressing is used are not convincing (Siler and Reid 1942, Lischer and Elman 1943); but after freezing injuries Fell and Hanselman (1943) observed both a considerable improvement in the survival-rate and a much smaller rise in the hæmatocrit reading, when a plaster cast was applied to the injured limb.

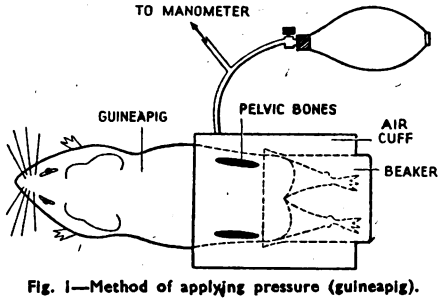

Fig. 1—Method of applying pressure (guineapig).

The following observations (reported to the burns subcommittee of the War Wounds Committee, Medical Research Council in September, 1943) were made in an attempt to prevent the rapid accumulation of œdema fluid—50% within 30 minutes—noted in the skin after burning (Leach, Peters and Rossiter 1943). The effects of external pressure and coagulating agents were also compared. The mechanism of the œdema formation and measures of prevention have been discussed elsewhere (Rossiter 1943).

METHODS

The guineapigs were anæsthetised with 'Nembutal' (intraperitoneal injection) and burnt for 1 minute at 65° C. with a burning iron (Leach, Peters and Rossiter 1943). The burn was made on the flank, immediately over the pelvic bones. By enclosing the guineapig's legs in a small beaker and wrapping the hind-part of the animal with a rubber cuff, as used for blood-pressure measurements, controlled air pressure could be applied to the burned skin (fig. 1). This method was satisfactory only if the burn was made over the rigid pelvic bones. The œdema present was estimated by killing the animal and doing wet-weight/dry-weight determinations on the excised burnt skin.

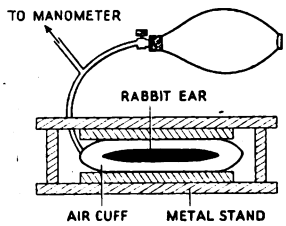

Fig. 2—Method of applying pressure (rabbit).

Rabbits were anæsthetised with ether and the ears were burnt by dipping them (about half the ear) in water

* This work was finally planned after an informal discussion of a memorandum from Dr. R. B. Bourdillon to the burns subcommittee of the War Wounds Committee, Medical Research Council.

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at 65° C. for 1 minute. Controlled pressure was applied to the ear by surrounding it with a rubber cuff, supported by a metal stand (fig. 2). Œdema was estimated by measuring the volume of the entire ear by water displacement.

RESULTS

Fig. 3 shows that the increase in water content (expressed as a percentage of the water content of the skin from the same region on the opposite side of the body) of guineapig skin, after a 1-minute burn at 65° C., was of the order of 100%. This was reduced greatly by raising the external pressure to 5 mm. Hg and further still by raising it to 10 mm. With pressures greater than 10 mm., the diminution in water content was not striking (table I).

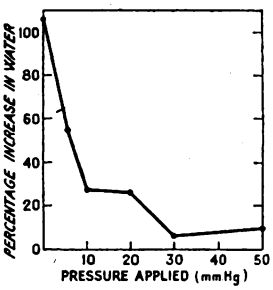

Fig. 3—Effect of external pressure on the increase in water content (expressed as a percentage of the water content of the skin from the same region on the opposite side of the body) of burnt guineapig skin. Animal killed 3 hours later. Each point is the mean for at least 4 animals.

Table II shows that when the pressure was applied immediately after burning and maintained until the animal was killed, formation of œdema was almost completely inhibited. When 3 hours' pressure was followed by 3 hours without pressure, the inhibition was less, though still statistically significant. The same was true when the pressure was not applied until 3 hours after burning.

That the application of pressure caused no consistent difference in the time at which the scab was shed or the time taken for the complete regeneration of epithelium is demonstrated in table III.

Effect of coagulating agents.—It is often said that coagulation decreases œdema formation. The following experiment indicates that neither tannic acid, tannic acid followed by silver nitrate, gentian-violet nor triple dye —all widely used coagulating agents—is of value in preventing it.

Identical burns (1 minute at 65° C.) were made on the two sides of a guineapig; the epidermis was gently wiped away with moist cotton-wool, and one side was treated with the agent under study, the opposite side serving as a control. Table IV shows that none of the coagulating agents affected the water content of the skin. For purposes of comparison, a summary of the figures taken from table I and expressed in the same form, is also given.

Pressure on rabbit's ear.—Both ears were burnt as described above, and pressure was applied to one of them. Table V shows that, with a pressure of 5 mm. Hg there was an increase in volume of both treated and untreated ears, but with a pressure of 10 mm. and upwards, the increase in the treated ear was much less. When pressure was maintained only for the first 4 hours after burning, the volume of the pressure-treated ear 24 hours later remained less than that of the control ear.

TABLE I—EFFECT OF EXTERNAL PRESSURE ON INCREASE IN WATER CONTENT OF BURNT SKIN OF GUINEAPIGS. (ANIMAL KILLED AFTER 3 HOURS)

Pressure applied (mm. Hg)	No. of animals	Mean increase in water content (%)	S.E. mean	P*
0	17	104	± 4	..
5	6	54	± 7	< 0·01
10	5	27	± 8	< 0·01
20	5	26	± 6	< 0·01
30	4	6	± 4	< 0·01
50	4	10	± 12	< 0·01

* The value of P tabulated in this and table II is that obtained in the test for the significance of the difference between the mean increase in water content with no external pressure applied, and the mean increase in water content after application of the stated external pressure.

TABLE II—EFFECT OF DIFFERENT METHODS OF APPLYING EXTERNAL PRESSURE (20–30 MM. HG FOR 3 HOURS) ON INCREASE IN WATER CONTENT OF BURNT SKIN OF GUINEAPIGS

Treatment	No. of animals	Mean increase in water content (%)	S.E. mean	P
No pressure applied. Animal killed 3 hrs. after burning (table I)	17	104	4	..
Pressure applied at once and maintained 3 hrs. — Animal killed at time of release of pressure	9	17	5	< 0·01
Pressure applied at once and maintained 3 hrs. Animal killed 3 hrs. after release of pressure	5	56	8	< 0·01
Pressure applied 3 hrs. after burning and maintained 3 hrs. Animal killed 3 hrs. after release of pressure	6	48	11	< 0·01
No pressure applied. Animal killed 6 hrs. after burning ..	5	85	22	0·19

DISCUSSION

These results show that relatively small pressures, applied externally, will greatly diminish œdema formation in the skin of guineapigs and rabbits. The pressure is most effective if applied immediately after burning, but it is still beneficial if applied 3 hours later—at a time when, for the guineapig burns studied, œdema formation is complete. If it is applied during the period of maximum œdema formation and then released, œdema develops but not to the same extent as in untreated burns. This suggests that, if human burns are treated with skin-tight plasters or pressure dressings, these should be applied early and pressure should be maintained throughout the period of œdema formation (up to 48 hours in human burns).

TABLE III—RATE OF HEALING AFTER APPLICATION OF EXTERNAL PRESSURE (20–30 MM. HG FOR 3 HOURS) TO BURNT SKIN OF GUINEAPIGS

Guinea-pig	Day scab shed		Day of complete regeneration of epithelium	
	Pressure applied	No pressure	Pressure applied	No pressure
A	26	27	36	35
B	21	16	32	29
C	19	26	29	37
D	25	17	36	30
Mean	23	22	33	33

Although the present investigation was not designed for the study of rates of healing, it is noted that applica-

TABLE IV—EFFECT OF DIFFERENT TREATMENTS ON THE WATER CONTENT OF THE BURNT SKIN OF GUINEAPIGS. (ANIMALS KILLED AFTER 3 HOURS)

Treatment used	No. of animals	Mean value of excess water in untreated skin*	S.E. mean	P †
Tannic acid 20% ..	6	− 5	± 4	0·30
Tannic acid 10% followed by silver nitrate 5% ..	6	− 1	± 3	0·74
Gentian-violet 2% ..	6	1	± 7	0·89
Triple dye ‡	6	8	± 6	0·25
Pressure (10 mm. Hg) ..	35	75 §	..	< 0·01

* Expressed as a percentage of water in treated skin.
† The value of P tabulated is that obtained in the test for the significance of the mean value of the excess water.
‡ The formula for the triple dye used was: gentian-violet 1/400, brilliant green 1/400, acriflavine 1/1000.
§ Figure obtained from the mean of 17 control and 19 pressure-treated animals.

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TABLE V—EFFECT OF PRESSURE ON INCREASE IN VOLUME OF BURNT EAR OF RABBIT. (PRESSURE APPLIED AT ONCE AND MAINTAINED 24 HOURS)

Pressure (mm. Hg)	Rabbit. Vol. of ear (ml.)	Increase in vol. of ear burnt only (ml.)	Increase in vol. of ear burnt and compressed (ml.)	Increase in vol. of compressed ear *
0	B (35)	19	19	100
	C (30)	20	21	105
5	L (34)	18	17	94
	M (29)	18	11	61
10	J (35)	23	10	43
	K (29)	17	6	35
20–30	G (35)	16	5	31
	H (33)	22	6	27

* Expressed as percentage of increase in vol. of untreated ear.

tion of pressure during the stage of œdema formation had no adverse effect on the time taken for the scab to be shed or on the time required for complete epithelial regeneration. In clinical studies of the effects of external pressure on burns, a diminution of the healing time has been reported by various authors; but to demonstrate this in laboratory animals the pressure would probably have to be maintained much longer.

The observation that some of the coagulating agents in common use do not lessen cutaneous œdema in experimental burns does not mean that they may not be of

TABLE VI—EFFECT OF PRESSURE ON INCREASE IN VOLUME OF BURNT EAR OF RABBIT. (PRESSURE APPLIED AT ONCE. EAR VOLUME MEASURED 24 HOURS AFTER BURNING)

Rabbit. Vol. of ear (ml.)	Treatment	Increase in vol. of ear burnt only (ml.)	Increase in vol. of ear burnt and compressed (ml.)	Increase in vol. of compressed ear *
E (34)	30 mm. Hg for 4 hours	26	17	65
F (27)	30 mm. Hg for 4 hours	23	20	87
I (30)	10 mm. Hg for 4 hours	16	12	75

* Expressed as percentage of increase in vol. of untreated ear.

value in preventing the *external* loss of fluid from exposed weeping surfaces. In human burns such loss may be considerable, and its prevention a significant part of treatment.

SUMMARY

1. External pressures of the order of 10 mm. Hg applied in an air cuff greatly reduce œdema formation in burnt guineapig skin.

2. The pressure is most effective if applied immediately after burning.

3. Neither tannic acid (20%), tannic acid (10%) followed by silver nitrate (5%), gentian-violet (2%), nor triple dye, influences the formation of œdema.

4. Similar pressures applied in an air cuff greatly reduce œdema formation in the burnt ear of a rabbit.

I wish to thank Prof. R. A. Peters for his continued interest in this work. Thanks are also due to Miss J. Jenkins for technical assistance and to the Carnegie Trustees for a personal grant. The work was done on behalf of the Burns subcommittee of the War Wounds Committee, Medical Research Council, and the Council has contributed toward its cost.

Note (R. A. Peters)

It seems advisable to stress some of the practical considerations in regard to the measurements made by Rossiter, since, in view of the recent American work, pressure treatment is receiving much attention. His experiments admittedly require extension to larger animals (1) to make sure that the comparatively small pressures which he finds capable of reversing œdema apply to larger areas and (2) to obtain information as to whether healing time is improved—i.e., whether there is improved therapy of the burn in addition to reduction in the initial shock.

Nevertheless the experiments support the prevailing idea of the value of pressure, and at the same time they indicate that the pressure should be applied early—i.e., as a first-aid measure, because we have shown that changes in the tissue which lead to hæmoconcentration start very soon after burning. It is imperative now to start looking for some means by which unskilled hands could apply pressure of this order. Attempts should be made to develop membranes of suitable elasticity for use in first-aid treatment.

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LATE RESULTS OF PERFORATED PEPTIC ULCER

CECIL P. G. WAKELEY, CB, DSO LOND, FRCS, FACS, FRACS
SENIOR SURGEON, KING'S COLLEGE HOSPITAL; CONSULTING SURGEON, ROYAL NAVY; TEMPORARY SURGEON REAR-ADMIRAL

THE subject of perforated peptic ulcer has never been of such importance as it is today, for since the bombing of Britain began there has been an increased incidence in both sexes; this has been noticeable among civilians and the personnel of the Fighting Forces.

The late end-results of operation are not known, and it was because of this that the Medical Director-General of the Navy, in 1941, asked me to investigate the problem from the point of view of the Navy. If, within a few years of the accident, the perforated peptic ulcer patient was invalided from the Service, it would be far better to invalide all cases as soon as they were convalescent from the operation.

It was decided that a period of 10 years should be investigated at the Royal Naval Hospital, Haslar. The period chosen was 1924–34. There were 103 cases admitted to the hospital during this time, and all were submitted to operation, with a case-fatality of 8%, a remarkable figure. The average age of the patients was 32 years. The very small mortality, in my opinion, was due to the fact that these naval officers and ratings were fit men, apart from their peptic ulcer, and also that the time factor between perforation and operation was short, the average time being 4 hours. Again, medical officers in the Navy are well acquainted with this type of operation, and can deal with it with sound surgical skill.

In contrast with this Naval series, I have collected 102 cases of my own, both hospital and private, from the years 1924 to 1934. In these, the average age was 46 years and the case-fatality 20%. The higher mortality was due to the poor condition of many of these patients, and also to the long period which elapsed between the actual perforation and the time of operation—an average of 10 hours; in some as much as 18 hours. Patients who perforate in country districts often delay several hours before sending for the doctor, then have to wait some hours before a doctor is available, and subsequently may be sent to London by ambulance, which does not predispose to a good result.

The table comparing these two series brings out many important practical facts.

The "follow-up" of the Naval cases has been easier than that of the civilian ones—out of the 103 Naval cases, only 5% were untraced. In the civilian cases, 22% were not traced. This is not to be wondered at when it is considered that this investigation was begun in 1941, when so many people were bombed out of their homes and evacuated to widely separated districts. It is interesting that in the Service cases 54% and in the civilian cases 51% of the perforations were gastric in origin. One would have expected a higher incidence of duodenal perforations.

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	King's College Hosp.	*RN Hosp., Haslar*
Total cases	102	103
Average age (yr.)	46	32
Perforated duodenal ulcer	49%	45·5%
Perforated gastric ulcer	51%	54·5%
Died	20%	8%
Killed by enemy action	3%	1%
Died after some years from re-perforation	2%	2%
Died after some years from other causes	23%	8%
Invalided for causes other than perforated peptic ulcer		8%
Pensioned		6%
Discharged; non-medical reasons		2%
Discharged; termination of engagement		4%
Still serving in HM Forces	20%	44%
Alive, but doing no military service	10%	12%
No record	22%	5%

The main issue of this investigation has been the fact that 44% of perforated peptic ulcer cases are still serving in the Royal Navy, the longest time since operation being nearly 20 years and the shortest time 9 years. On the civil side, 20% of perforated peptic ulcer cases are serving with the Armed Forces, the longest case traced being 20 years after perforation. It must be remembered however that the average age of the civilians at perforation was 46 years, and that 22% of these have not been traced, so that we might expect a higher figure in these cases. It seems quite clear, therefore, that the perforated peptic ulcer patient should not be invalided from the Service but given a careful convalescence, as he is likely to continue to be a useful member of the Royal Navy.

It can be definitely stated that the prognosis is better in perforated cases than in any other form of peptic ulcer. Recurrence of pain or other symptoms is unusual, and the patient can live an ordinary life. With the large call-up of men of all classes during the past 2 years, there has been a tendency to refuse all men who have had a perforated peptic ulcer. This seems to be quite unwarranted, considering that a high proportion have never had a sign or symptom of their former trouble since their operation.

Graham [1] has reported a case-fatality of 1·9% in a series of cases of perforated peptic ulcer, and there is no doubt that this figure can be reduced. In the Royal Navy today it is uncommon to lose a case of perforated peptic ulcer, and the operative mortality is about 1%; this is because gastric suction by means of a Ryle's tube is instituted immediately the diagnosis is made and continued until the actual operation is begun. This procedure ensures that the stomach is afforded physiological rest, and reduces soiling of the peritoneal cavity to a minimum. The treatment of shock, examination of urine and blood, and the preparation of the operating-theatre take some time, so that several hours may well elapse between the time a patient arrives in hospital and the commencement of the operation.

The actual operation is a simple one. The abdomen is opened by a right paramedian incision, and the perforation located. Any debris is removed with a sucker, and simple closure of the perforation is performed, the suture being covered by an omental graft. No attempt is made to do any such procedure as partial gastrectomy or a gastro-enterostomy. It is surprising how an apparently reduced lumen of the duodenum after closure of the perforation will increase to normal size in a very short time. This has been proved over and over again by X-ray photographs 2 or 3 weeks after the operation. In the rare case in which stenosis does occur, gastro-enterostomy can be performed later under ideal conditions, and gives an excellent result.

Another important factor in decreasing the mortality is the use of sulphanilamide in the peritoneal cavity, over the area of soiling, and in the abdominal wound. No drainage is employed in any case. It is quite safe to use 12–15 g. of sterile sulphanilamide powder in the abdominal cavity.

Lastly, the incidence of subphrenic abscess following perforated peptic ulcer is reduced to vanishing point. The reason for this is threefold—the universal use of the Fowler position; the local use of sulphanilamide; and making the patient breathe "carbogen" three times a day for 4 days after operation. The carbogen makes the patient breathe deeply, so that the diaphragm undergoes full excursions, and it also prevents collapse of the lower lobes of the lungs.

1. Graham, R. R. *Surg. Gynec. Obstet.* 1927, **64**, 235.

SUMMARY

A follow-up of 103 cases of perforated peptic ulcer operated on at a Royal Naval hospital between 1924 and 1934 showed that 44% are still serving in the Royal Navy. Only 8% of these men had died, compared with 20% of a comparable series of civilians.

The perforated peptic ulcer patient need not be invalided from the Service; nor need a history of perforation necessarily mean refusal by recruitment medical boards.

I should like to thank Surgeon Vice-Admiral Sir Sheldon Dudley for suggesting this investigation and for giving me every facility to carry it out. My thanks are also due to Mr. W. G. Grant of the Statistics Branch, Medical Department of the Navy, who has been of great assistance in tracing the various patients in the Navy; some of the follow-up cases have taken much time and energy.

PERFORATION OF GASTRIC AND DUODENAL ULCERS

A SERIES OF 312 CASES

STANLEY C. RAW, MS DURH, FRCS

LATE RESIDENT SURGICAL OFFICER AT THE ROYAL VICTORIA INFIRMARY, NEWCASTLE-ON-TYNE

THE object of this paper is to record the experience gained and the results obtained in a large personal series of cases of perforation of gastric and duodenal ulcers. As all except the first 26 cases have been operated upon since September, 1939, little can be gained by attempting to assess the end-results. The subject was reviewed by Michael De Bakey [1], who analysed as far as possible all the cases reported in the previous decade—a total of approximately 20,000. The average fatality-rate over that period was 25·2%, ranging from 26·1% in 1930, to 23·7% in 1939. In 1923 it had been 42%. Some of his data are included in the tables below.

During the 5 years 1937–41, there was a steady rise in the number of cases of perforation admitted to the public wards of the Royal Victoria Infirmary, the figures being 181, 198, 200, 222 and 251—a total of 1052. The average age remained very near 42 years. In the vast majority of cases the patient was a man and the ulcer was duodenal. Three cases of perforated carcinoma of the stomach on which I operated are not included in this series.

In atypical cases the diagnosis may give rise to difficulty, and perforation is sometimes simulated closely by such conditions as coronary thrombosis, pleurisy, cholecystitis, pancreatitis, perforated appendicitis, renal colic, and obstruction of the small bowel. In perforation the onset is nearly always dramatic, with little vomiting or change in pulse and temperature. The pain does not vary and the patient usually lies still. Breathing is short and thoracic in type. In pleurisy, rigidity may sometimes be overcome by holding the breath; in colic, it is commonly removed by breathing; but in perforation it never disappears completely.

Before operation at least 60% of cases have pain referred to one or both supraclavicular regions, due to irritation of the under surface of the diaphragm by gastric contents or bile. In my experience the clinical sign of diminished liver dullness is dangerous and misleading. It is present only in obvious cases, and one must take account of variations in normal size of the liver, paralytic distension, intestinal obstruction and emphysema of the lungs. Accurate percussion even of a normal liver in the mid-axillary line is not easy without much practice. By radiography it is sometimes possible to demonstrate free gas beneath the diaphragm. An anteroposterior film with the patient lying on his left side may be particularly useful.

1. *Surgery*, 1940, **8**, 852.

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The pulse-rate and temperature remain normal for only a few hours and are of little help in distinguishing a 24-hour perforation from any other peritonitis, with the proviso that the temperature is under 101°. In such cases reliance must be placed on a careful history of the onset of the illness and on such features as early shoulder-tip pain or persistent rigidity of the right upper rectus muscle.

A combination of upper and lower abdominal rigidity usually indicates a primary upper abdominal peritonitis, particularly if the rigidity is greater on the right than the left. In doubtful cases the persistence of right upper rectus rigidity after the pain has been somewhat relieved by morphine will aid the diagnosis.

TABLE I—SITES OF PERFORATION IN 312 CASES

Site	Male	Female	Total
Gastric	11	4	15
"Pyloric"	8	1	9
Duodenal	269	13	282
Anastomatic ..	5	1	6
Total	293	19	312

TREATMENT

Morphine or its equivalent should be given as soon as the patient has been examined by the surgeon. If patients are in very severe pain, or have a long journey to hospital, it may justifiably be given by the practitioner. Most patients require little preoperative preparation, but one or two pints of blood-plasma should be given in cases of severe shock. There can be no hard and fast rule for this, but a patient with a pulse-rate over 100 per minute and systolic blood-pressure under 100 mm. Hg should be regarded as seriously ill.

Anæsthetic.—In most cases of early perforation I have found open anæsthesia satisfactory. It is greatly facilitated by injecting the rectus sheath with 1% procaine. Severe cases can usually be operated upon satisfactorily under local anæsthetic. No complicated technique is required. Injections are made beneath the costal margin deep to the external oblique, and in the line of skin incision. If the perforation is a little inaccessible and it is necessary to drag on the mesenteries, additional intravenous 'Pentothal' is advisable. This also makes it possible to suck or mop fluid from the subphrenic spaces. I have no experience with spinal anæsthetic in perforations, but it appears to be contra-indicated when there will be subphrenic irritation combined with the considerable temporary lower intercostal paralysis due to the anæsthetic.

As a routine I use a midline incision. It does not matter how high it extends, but wound suturing and repair are greatly aided if the lower end is at least 1 in. above the umbilicus. Deep sutures should always be inserted. It is almost never necessary to do more than close the perforation and for safety to tie over a tag of neighbouring omentum. If there is any stenosis the stomach can be kept empty by a nasal catheter. Very occasionally a gastro-enterostomy is necessary at the time of operation or during the ensuing few weeks.

TABLE II—RELATION OF TIME OF PERFORATION TO CASE-MORTALITY: DE BAKEY'S SERIES (5908 CASES) COMPARED WITH PRESENT SERIES

De Bakey's series		Raw's series				
Hours	Mortality (%)	Cases		Deaths		Mortality (%)
		M	F	M	F	
0–6	10·5	136	3	9	0	6·5
7–12	21·4	107	3	16	0	14·6
13–18	38·5	25	3	7	1	28·6
Over 18	62·4	25	10	8	4	34·3
Total	25·2	293	19	40	5	14·4

Note.—40 male deaths (13·7 %); 5 female deaths (26·3 %).

No drain is necessary excepting in cases of long-standing perforations, which may almost have reached the stage of subdiaphragmatic or subhepatic abscesses. Such perforations can be readily sutured, with drainage through a primary right subcostal incision, under local anæsthesia.

In dehydrated patients operated upon under general anæsthesia, great benefit can be derived from injecting one pint 5% glucose in saline into each axillary region at the end of the operation. I have never seen an infection follow this procedure, but complete asepsis is essential. In cases of pyloric stenosis or postoperative dilatation of the stomach, it will be necessary to give intravenous glucose-saline and to aspirate the stomach. Postoperative distension can often be relieved by continuous application of an electric blanket to the abdomen.

COMPLICATIONS

Postoperative complications can be mentioned only briefly. General peritonitis is all too common. Pelvic abscess is so uncommon that it may not be suspected. Liver, lung and brain abscesses are almost always fatal. There remains a group of complications, eminently suitable for treatment if recognised early enough—subhepatic, subdiaphragmatic abscesses and empyema thoracis. The last is comparatively rare. The aphorism of Rutherford Morison, "Pus somewhere, pus found nowhere—therefore subphrenic abscess," is often life-saving. Nearly all subphrenic abscesses following perforations are on the right side, and it is common to find abscess cavities beneath the diaphragm and between duodenum and liver at the same time. These can often be drained together through a subcostal incision, under local anæsthetic. Although this is not the most direct approach to the subdiaphragmatic region, the risk of empyema is largely avoided and an abscess situated at the lower level is not missed.

TABLE III—RELATION OF CASE-MORTALITY TO AGE

De Bakey's cases		Raw's cases		
Age (year)	Mortality (%)	Cases	Deaths	Mortality (%)
0–19	14·3	5	0	..
20–29	12·2	36	2	5·6
30–39	18·9	92	5	5·4
40–49	28·0	87	14	16·1
50–59	40·8	55	13	23·6
60–69	55·3	34	10	29·4
70–79	53·8	3	1	33·3

Note.—Under 42 years, 12 deaths in 157 cases (7·6 %).
Over 42 years, 33 deaths in 155 cases (21·3 %).

DISCUSSION

Perforated ulcer should be regarded as one of the most important of abdominal diseases. The total number of deaths, at any rate in the Newcastle area, is considerably greater than the total for appendicitis, though the latter condition is commoner. The patients are usually in the prime of life and the fatality-rate varies greatly with early diagnosis, experience and careful surgery. There is often, especially in war-time, considerable preoperative malnutrition, often associated with multiple vitamin deficiencies. Apart from earlier diagnosis, the case-mortality can only be reduced by curing those who now die after putting up a fight. This means careful postoperative observation and nursing and diligent searching for the cause of a stormy convalescence. From this point of view perhaps the most important complications are dehydration, dilatation of the stomach, massive collapse of the lung, and later subphrenic abscess.

The present series of cases gives additional support to the well-known thesis of Professor Grey Turner and others, that the fatality-rate runs closely parallel to the number of hours between perforation and operation. It also illustrates the effect of advancing years in making the prognosis worse. Perforations in women are uncommon, but a trap to the unwary. So many, when first seen, have been diagnosed as gall-stones and given

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a sedative, that in over half the cases in my series operation was delayed for more than 18 hours. Consequently there is a high fatality-rate. If all patients with true upper abdominal rigidity were referred to hospital, irrespective of the provisional diagnosis, this danger would be decreased.

The results in the series are given in tables I, II and III.

At least 13 of the patients in my series had had one or more previous operations for perforation. In one case the perforation was into the lesser sac of the peritoneum, and in another, owing to a congenital abnormality of the transverse mesocolon, a perforation of the posterior wall of the stomach was into the general peritoneal cavity. Two patients, of whom one died, had had very recent severe hæmatemesis.

As far as possible the mortality figures include remote complications: 2 patients died many months later from septic meningitis, with an intervening history of subphrenic abscess and empyema in one case and chronic lung abscess in the other; 2 died at home, when they had left hospital against medical advice; 1 died from a purely anæsthetic complication, following gastro-enterostomy performed 11 days after suture of the perforation. In all, 10 patients were operated upon for subphrenic abscess, with an ultimate mortality of 50%. There was one case of pelvic abscess, which recovered. No empyema uncomplicated by subphrenic abscess was encountered.

SUMMARY AND CONCLUSIONS

A series of 312 perforated gastric and duodenal ulcers is reported, with a gross mortality of 14·4%. The two most important factors influencing operative mortality were the age of the patient and the interval before operation.

Supraclavicular pain was present in 60% of perforated ulcers and was often of great diagnostic help.

Experience suggests that immediate operative mortality can be reduced by local anæsthesia and intravenous blood-plasma in selected cases. Operative intervention should be minimal, reasonably rapid and gentle.

Subcutaneous saline injection was beneficial in dehydrated patients who were fit to be operated upon under general anæsthesia.

A constant look-out should be kept for the common complications of dilatation of the stomach, acute bronchitis and massive collapse of the lung. Unexplained persistent fever usually indicates a residual abscess in the subphrenic regions or an infected wound. Clinical examination, a blood count and radiography will usually give the diagnosis.

I am indebted to my chiefs at the Royal Victoria Infirmary, and particularly to Prof. F. C. Pybus, Mr. J. Hamilton Barclay and Mr. John Gilmour, for the opportunity I had to treat these patients in their wards.

PERFORATED PEPTIC ULCER
DURING THE PERIOD OF HEAVY AIR-RAIDS

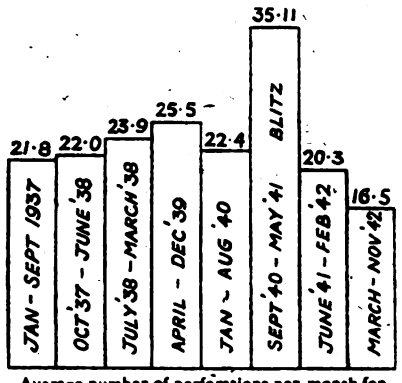
C. C. SPICER, MRCS D. N. STEWART, MRCS
D. M. DE R. WINSER, BM OXFD

IN 1942[1] we showed that figures from 16 London hospitals demonstrated a rise in the incidence of perforated peptic ulcer during the first 4 months of the heavy air-raids on London. To confirm that this rise was no mere artefact we now present figures for the whole of the raid period, together with those for the 18 months following the raids, the raid period being considered to extend from September, 1940, to May, 1941, inclusive. The same 16 hospitals have shown the same kindness in allowing us to make use of their work and records. The figure, which gives a picture of our findings, is made up by taking the average number of perforations per month for eight successive periods, one of them being the blitz period. For those who prefer statistics, C. C. S. has prepared the following note.

The figures have been analysed first to see whether the mean number of perforations during the blitz period is greater than that for the years 1937–38–39, which were assumed to be normal. The mean number per month in these years is $22{\cdot}71 \pm 0{\cdot}767$. The corresponding mean for the blitz months is $35{\cdot}11 \pm 6{\cdot}62$. With 44 degrees of freedom this difference gives $t = 3{\cdot}494$ and $P < 0{\cdot}01$. This difference is therefore highly significant.

The difference between the mean for the post-blitz months and the mean for the prewar months gives $t = 2{\cdot}224$, $P = 0{\cdot}03$, which is on the borderline of significance. But, since the mean of the post-blitz months is $18{\cdot}42 \pm 2{\cdot}24$, we may say that the months following the blitz showed a lower rate of cases.

The prewar years were analysed to determine whether there was any evidence in the data to show a yearly trend. Analysis of variance shows no difference between the years, though 1939 is suggestively high (variance ratio = 2·47 on 2 and 22 degrees of freedom). Differences between months are highly significant (variance ratio 5·62 on 11 and 22 degrees of freedom). The two months showing greatest variance are August and December. August is barely significantly higher than January, which has the next highest average, and is very significantly lower than December, which has the highest average of cases (33·667). The t test for these two months gives $t = 6{\cdot}09$ on 44 degrees of freedom, which is very highly significant. The investigation of these figures was made by an analysis of variance, the deviations between months and between years being eliminated, and significance of means tested using the residual mean squares.



Average number of perforations per month for successive periods from 1937 to 1942.

The distribution of number of cases in the prewar years was according to a Poisson distribution, since the mean and the variance were approximately equal (mean = 22·71, variance = 21·14). This implies that there was no widespread cause tending to produce perforations, and that cases occurred at random. On the other hand, this was decidedly not so during the blitz period (mean = 35·11, variance = 395), which suggests that there was some new general cause operating. The difference in the ensuing years is less marked, but there seems still to have been a departure from randomness (mean = 18·42, variance 95). This would suggest that there is some general tendency to perforation apart from the very definite trend during the raiding conditions.

In a previous paper we attempted to summarise the available evidence on the causation of peptic ulcers and the complications of peptic ulcers, and showed that there was considerable evidence that anxiety might be an important cause. The purpose of the present paper is only to put the increase during air-raids on a firm statistical foundation. There was no change in age- or sex-distribution from that previously recorded (mean age in the previous series, $48{\cdot}59 \pm 0{\cdot}46$; in the years 1941–42, $48{\cdot}22 \pm 0{\cdot}32$; sex-distribution 7 female to 93 male perforations).

SUMMARY

The increase in perforated peptic ulcer during the period of heavy raiding was statistically significant when compared with the previous three, and the following two years.

Statistical evidence is in favour of some general tendency having operated during the air-raid period to cause perforations, and of some other, or less active, general tendency operating in the two following years.

There is also a significant increase in perforations in the month of December.

1. *Lancet*, 1942, i, 259.

TERMS USED IN SEX HORMONE THERAPY.—The reprint of Dr. Frank Hartley's excellent glossary from the *Pharmaceutical Journal* (pp. 19, 1*s*.) should be useful to those who find it difficult to thread their way through the maze of endocrine terminology, and especially to those who like to have some knowledge of the chemistry of the drugs they use.

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CONTINUOUS INTRAVENOUS ADRENALINE IN SPINAL ANÆSTHESIA

FOR THE CONTROL OF BLOOD-PRESSURE

FRANKIS EVANS, M B LOND, D A

ANÆSTHETIST TO ST. BARTHOLOMEW'S HOSPITAL, LONDON, AND TO ST. MARK'S HOSPITAL, CITY ROAD

MANY recommendations have been made for the control of blood-pressure during spinal analgesia, but the pressor effects of the various drugs have been both transient and disappointing when used in conjunction with high spinal block. Spinal analgesia has been looked on askance by many surgeons for this reason, and there have been deaths after high spinal block which would not have occurred if the blood-pressure had been under complete control. The work of Pitkin (1940) stimulated me to find a method that was entirely safe and easily controlled. Pitkin uses adrenaline mixed with a starch protein intramuscularly, and he claims excellent results with this method which liberates the adrenaline slowly over a long period. I thought, however, that adrenaline was best administered continuously in minute dosage during the time that it was most needed, and by a method that gave the anæsthetist complete control over so powerful a drug. Adrenaline in adequate dilution is eminently suited for intravenous injection because it is so rapidly oxidised in the body. Pitkin also states that it is the lack of adrenaline secretion which causes the fall of blood-pressure in spinal analgesia.

Theories of fall in blood-pressure vary and I do not intend to argue their respective merits at length, but it will be worth while mentioning some of them.

Labat (1930) suggested that the fall was due to cerebral anæmia following splanchnic dilatation, and recommended the Trendelenburg position to counteract this. In my experience this will not prevent fall of blood-pressure, but may reduce any cerebral anæmia resulting from a fall of blood-pressure, provided the Trendelenburg position is not such as will embarrass the heart from pressure due to the weight of abdominal viscera. Porter and Smith (1915) attributed the fall of blood-pressure to paralysis of the splanchnic nerves causing a pooling of blood in the splanchnic area. If this were so, surely the abdominal viscera would appear engorged with blood; but in actual fact the intestine is contracted during spinal block, and there is no obvious engorgement of the blood-vessels.

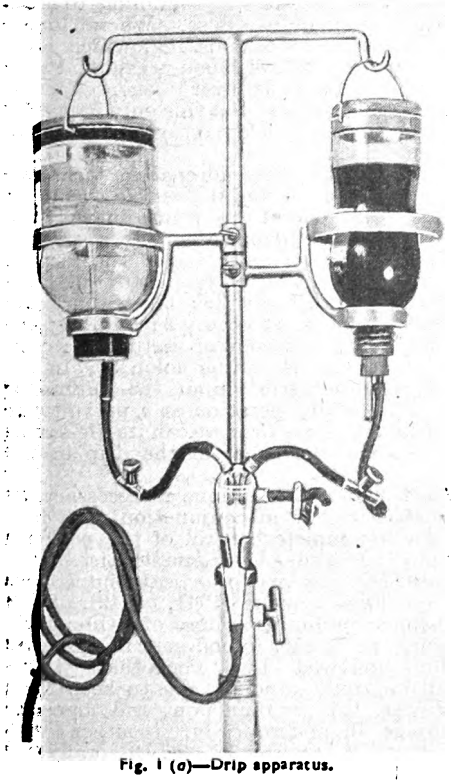

Fig. 1 (*a*)—Drip apparatus.

Maxson (1938) states that the fall of blood-pressure is probably caused by several factors acting in conjunction. He suggests that the pressor impulses passing along the white rami communicantes become progressively paralysed as a result of the spinal block. If the analgesia is sufficiently high the heart will be slowed and the respiration impaired; the blood-vessels throughout the body will be completely relaxed, and in consequence the blood-pressure will fall seriously. Babcock (quoted by Maxson) states that a fall to 60 or 70 mm/Hg does not alarm him. Some patients tolerate a fall of blood-pressure satisfactorily, but there are others whose cardiovascular system is no longer resilient, and it is these who show severe distress.

Pitkin states that adrenaline is necessary to the working of the cardiovascular reflexes, and that the fall of blood-pressure is due to the paralysis of adrenaline secretion and of the chromaffin glands. He brings forward evidence in support of this in an exhaustive paper. This theory may or may not be correct, but the introduction of adrenaline intravenously restores the blood-pressure and enables the patient to maintain the even tenor of his way.

The blood-pressure is maintained in the body by myocardial tone and arterial tone, acting against capillary resistance and acting on an ample volume of blood supplied to the heart. These factors are controlled and correlated by the circulatory centre and by cardiovascular reflexes arising in the aortic arch and carotid body. Pitkin states that adrenaline is necessary to the working of the cardiovascular reflexes, and that the fall of blood-pressure in spinal analgesia is due to the cutting off of adrenaline secretion and to the paralysis of the chromaffin glands.

INTRAVENOUS ADRENALINE IN HIGH SPINAL BLOCK

When adrenaline is administered intravenously by the drip method in suitable dilution the blood-pressure rises and the heart shows a compensatory slowing. The blood-pressure of a patient who has had a high spinal block may fall as low as 50 mm. Hg. If dilute adrenaline solution be dripped into a suitable vein the blood-pressure rises until the normal is reached. If the drip then be continued at the same rate the rise will continue to a very high figure (240 mm. Hg). On the other hand, if the drip be stopped the pressure will fall rapidly to its original low level. The adrenaline should be so regulated that the blood-pressure is maintained at a suitable level, so that the patient does not lose too much blood from hæmorrhage, but is given an adequate circulation. Should the drip be suddenly greatly accelerated it is possible to cause cardiac irregularity. This however is never seen if reasonable care is taken.

Technique of administration.—A suitable vein in the forearm is chosen and the skin is prepared with spirit or iodine. If the vein is small, flick the skin over it a few times with the finger-nail; this will cause the vein to relax and dilate. A West Middlesex cannula and stilette is then introduced through the skin into the vein. The stilette is withdrawn and the cannula is attached to a saline drip apparatus. I prefer the 'Vacoliter,' but any good saline drip is suitable (fig. 1*a* and *b*). The saline is dripped into the vein at 80 or 90 drops per minute for some 20 sec. to clear the cannula of blood and then the drip control is set to some 50 drops per min. The cannula and tubing is fixed carefully with strapping and the arm is placed at the side. It is better not to use the veins in the antecubital fossa as the drip becomes obstructed if the arm becomes flexed. A blood-pressure cuff is applied to the other arm, and a stethoscope is strapped to the antecubital fossa. The blood-pressure is now taken and the patient is turned on to his side for the spinal puncture. As soon as the spinal anæsthetic has been introduced (*and not before*) and the patient turned on his back, the adrenaline is added to the saline in the vacoliter.

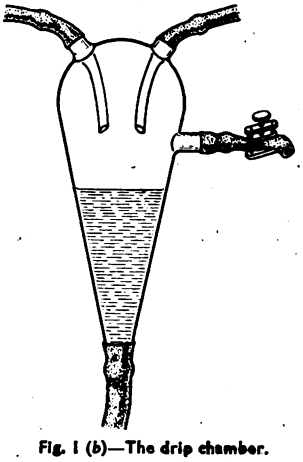

Fig. 1 (*b*)—The drip chamber.

Dosage.—When this series of cases was first begun a solution of 1 in 500,000 adrenaline in normal saline was used, but it was found that the rate of drip required to maintain the blood-pressure was too fast. The strength of adrenaline now used is 1 in 250,000 in normal saline. This is easily obtained by adding 2 c.cm. of 1 in 1000 adrenaline to 500 c.cm. of normal saline.

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Speed of drip.—This varies somewhat in different subjects, and according to the height of the anæsthesia. The fastest drip required was some 70 drops per min. when it was thought the adrenaline was not quite fresh. The slowest needed was 20 per min.; in this case the blood-pressure mechanism was not completely paralysed, but it was found that the pressure fell rapidly when the drip was stopped temporarily.

The anæsthetist should aim at maintaining the blood-pressure at an adequate level, and should guard against over-enthusiasm. It is not necessary to keep the pressure at the patient's normal, for this might lead to undue loss of blood from hæmorrhage. One of the drawbacks of pressor drugs when given intramuscularly is the temporary rise of blood-pressure above the normal with consequent hæmorrhage at the beginning of the operation—a condition bad for the patient and irritating for the surgeon. I aim at keeping the blood-pressure round about 110 mm. Hg in those patients whose normal is 140 mm. Hg; and at 130 mm. Hg in those who have a high pressure (180–200 mm. Hg).

The time for which the drip should be continued depends on the time the spinal block lasts. One drug used had a definite cumulative effect and some 2 hours after the drip had been stopped the patient's blood-pressure had risen to 240 mm. Hg. Adrenaline, however, has no cumulative effect, and once the drip is stopped the pressure falls almost immediately. When a long-acting spinal analgesic such as 'Nupercaine' is used, the drip should be continued postoperatively until the patient's own blood-pressure control mechanism again comes into action. This usually happens some 2–3 hours later, when the drip may be slowed and ultimately stopped. It is a simple matter to stop the drip for a minute and then take a blood-pressure reading. If the pressure falls during this interval then continue the drip for a while.

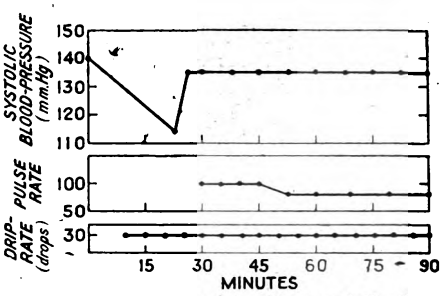

Fig. 2—Partial gastrectomy in a fit man of 45. Preliminary fall of blood-pressure with rise as adrenaline comes into action; maintained at 135 mm. Hg with a drip of 30 per min.

was added to the blood used for transfusion, but its pressor effect was found to be nil, so that it is probably oxidised in these circumstances. On the other hand, blood may be used in conjunction with the adrenaline drip (in the Officer apparatus), but the adrenaline drip must be run faster to compensate for the added fluid bulk.

About 250 c.cm. of the dilute solution of adrenaline is used per hour. This is equivalent to 1 c.cm. of 1 in 1000 adrenaline per hour intravenously. By-effects are absent if reasonable care is observed. It will be noticed that adrenaline is not put into the saline until after the spinal block has been performed. This enables the saline to be run in fast at the beginning to clear the cannula without risk of overdose. We no longer see the distressing nausea and vomiting, which is so often the concomitant of a fall of blood-pressure. Pallor is not obvious unless there is overdosage. Cardiac irregularity has been noted twice, but this only happened after gross overdosage, and quickly returned to normal when the drip was slowed.

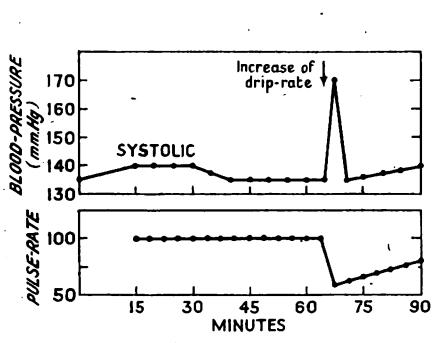

Fig. 3—Ileopelvic resection (Paul's operation) in a woman of 45. Adrenaline drip-rate inadvertently increased at beginning of second hour: pressure rose sharply to 170 mm. Hg and the pulse-rate fell. The drip was stopped temporarily and the pressure fell equally rapidly.

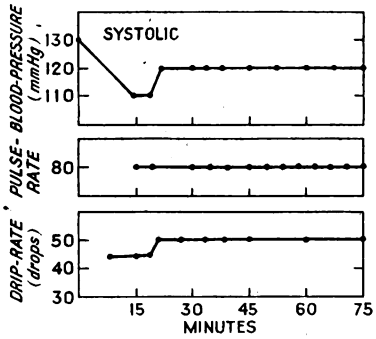

Fig. 4—Perineo-abdominal excision of the rectum in a frail woman of 67, with a rather low blood-pressure. The blood-pressure was maintained at 120 mm. Hg and the pulse at 80 per min. by means of an adrenaline drip of 50 per min.

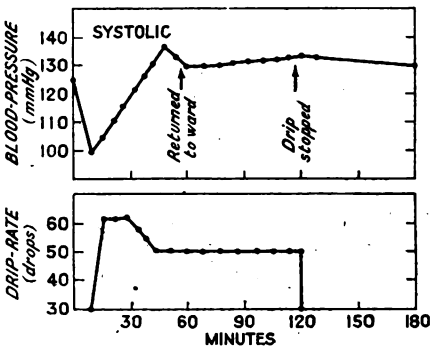

Fig. 6—Adrenaline drip continued postoperatively. Blood-pressure steadily rose until the drip was stopped 1 hour after the patient was back in bed; an hour later the blood-pressure was still 130 mm. Hg showing that the patient's own control mechanism was functioning.

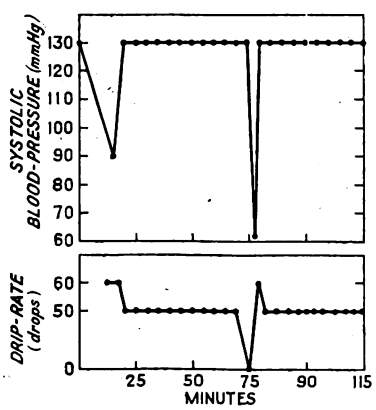

Fig. 5—Perineo-abdominal excision of the rectum with hysterectomy. The blood-pressure control mechanism was still out of action after 75 min., when the drip failed: immediately the blood-pressure fell steeply to 60 mm. Hg, recovering when the drip was restarted. Time from fall to recovery 5 min. Drip then remained steady and the blood-pressure after an operation lasting nearly 3 hours was 110 mm. Hg.

Stability of the adrenaline is assured by bubbling carbon dioxide through the saline before adding the adrenaline. This is necessary if ordinary sterile hospital saline is used. Unless this precaution is taken oxidation is likely, and the drug fails to exert its full pressor effect. There is no necessity to pass carbon dioxide through the vacoliter saline or 'Sterivac' saline; we have never had any trouble with oxidation when these particular brands have been used. Once or twice adrenaline

Since I have been using this adrenaline technique at St. Mark's and elsewhere, I find it possible to submit the poor-risk patient to operations which in the past would have been considered inadvisable. In a series of 138 major abdominal operations in which the method was used the immediate mortality has been nil. The cases were: partial gastrectomy 28; laparotomy 13; gastro-enterostomy 2; cholecystectomy 2; Paul's operation 4; perineo-abdominal excision of rectum 80; colostomy 6; resection of the ascending colon 3. In one case the emergency administration of the adrenaline drip during the course of an operation on a patient who appeared to be in extremis was dramatic in its life-saving action. Figs. 2–6 show the effect of the drip in five cases.

I do not suggest that the technique is necessary for every spinal anæsthetic, but in conjunction with high spinal block it gives complete control of the patient's blood-pressure into the hands of the anæsthetist.

The spinal anæsthetic employed was heavy nupercaine as described elsewhere (Evans 1941, 1942). Some patients were given a preliminary dose of 'Omnopon,' gr. ¼, and hyoscine, gr. 1/150, hypodermically an hour before operation, followed by 'Pentothal' intravenously and nitrous oxide and oxygen to keep them asleep. Others were given omnopon and hyoscine in suitable dosage hypodermically, together with 'Nembutal' gr. 3 or 'Seconal,' gr. 3 orally, to produce extreme drowsiness. The level of anæsthesia

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in all cases was to the nipple line, permitting painless exploration of the upper abdomen.

CONCLUSIONS

Whatever the cause of blood-pressure fall in spinal analgesia, the use of intravenous adrenaline in suitable dilution will control it.

Adrenaline is so rapidly oxidised in the body that it has no cumulative action, and is therefore safe if reasonable care is exercised in setting the speed of the drip. Rapid oxidation means immediate and complete control.

Dosage: 2 c.cm. of 1 in 1000 adrenaline to every 500 c.cm. of vacoliter saline. Speed of drip: 40–60 drops per min. Duration: until spinal analgesia is wearing off and patient's own control returning. Consumption: about 250 c.cm. of 1 in 250,000 solution (1 c.cm. of 1 in 1000) adrenaline per hour.

The use of adrenaline in this way adds to the margin of safety for the poor-risk patient.

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UNUSUAL CASE OF PELLAGRA

T. LIONEL C. HENDERSON, L A H DUBL
ST. BERNARD'S LCC (MENTAL) HOSPITAL, SOUTHALL, MIDDLESEX

A MAN, aged 57, an inmate for the last 14 years of this mental hospital, was admitted to the infirmary ward in April, 1943.

He was found to have congestive heart-failure and enlargement of the heart with ascites, œdema of the legs and lumbar region, and clinical evidence of severe anæmia. On the backs of the hands and feet and on the elbows there was a slight faintly pigmented rash; the skin round the anus and between the buttocks was dark brown. Over the bridge of the nose and upper part of the cheeks was a bright red rash resembling acne rosacea. Blood-count: red cells 2,500,000; Hb. 23%; colour-index 0·46; white cells 6000. Urine normal.

At this time the significance of the skin lesions was not appreciated and the patient was thought to be suffering from heart-failure due to profound secondary anæmia. He was given increased diet and ferri et ammon. cit., gr. 30 t.d.s. Several days later he was given 'Salyrgan' 0·5 c.cm. as a test dose. The injection was followed by abdominal colic and diarrhœa with blood and mucus in the stools for three days; there was also a fair diuresis. Two weeks later his general condition had further deteriorated. Two more blood examinations showed a progressive fall in red cells and hæmoglobin. The œdema which had partially subsided after the salyrgan now approached anasarca. His breathing was distressed.

It was suspected that he was suffering from pellagra. He was given nicotinic acid, 50 mg. t.d.s., the iron mixture being continued as before. Within 2 days, on this relatively small dose of nicotinic acid, the œdema vanished completely, ten pints of urine being passed on the first day, with improvement in the general condition and comfort. Dr. H. S. Stannus who examined the patient at this time regarded his condition as chronic but not typical pellagra.

The dose of nicotinic acid was gradually increased over 3 weeks up to 35 mg. daily; at the same time he was given ascorbic acid 100 mg. and riboflavin 9 mg. daily and an increased supply of milk. Thiamine was not given. It was thought that riboflavin might get rid of the rash on the face, but this showed no improvement. Blood-counts showed slow progressive improvement, the red cells reaching 4,250,000 and the Hb.% remaining at 55%. The patient seemed considerably better until the first week in October, when his previous signs and symptoms recurred, together with cachexia and loss of appetite. He died on Oct. 15, 1943.

Autopsy.—Lungs partially collapsed due to 3 pints of straw-coloured fluid in each pleural cavity; bronchopneumonia and brown induration due to chronic back pressure. Heart: right-sided dilatation; myocardium brown and fibrous; early atheromatous changes in coronary arteries and aorta. Abdomen contained 2 gallons of straw-coloured fluid, while stomach showed a very fine example of leather bottle or scirrhus malignant disease, the growth having embedded the omentum. No secondary deposits. Death from cardiac failure due to pellagra, secondary to carcinoma of the stomach.

Though the triad of diarrhœa, dementia and dermatitis were all present in this case, two appeared to be fortuitous, diarrhœa seeming to arise from intolerance to salyrgan and dementia being a sequel of chronic melancholia. It is possible the dementia was in part caused by the chronic pellagra, but this seems unlikely since his mental condition showed no change over a year—no worsening during the acute phase of his illness, and no improvement when his general condition improved. Glossitis and stomatitis, both common features of pellagra, were not seen while the patient was under observation, though they may have been present as transient symptoms before he came under treatment. He had no tachycardia, peripheral neuritis, tremulousness or vertigo while weight and appetite were only lost during the terminal 2 weeks. The advanced œdema, subsiding quickly when nicotinic acid was administered, is unusual, and can probably be explained by the vasodilating, and hence diuretic, action of the drug.

The patient had been receiving the ordinary hospital diet, and close questioning of the nursing staff leaves no doubt that not only did he take his food well but he always had a good appetite. This was noted even during his illness. He had also had small quantities of extra foodstuffs weekly from his relatives. Dr. Stannus, who has recently investigated a random sample of patients here for dietetic deficiencies, considers the diet to be adequate; so that there seems no possibility of any qualitative or quantitative dietetic deficiency in this case. No doubt absorption was defective because of the gastric lesion.

I should like to thank Dr. H. S. Stannus for his interest in this case; and Dr. J. B. S. Lewis, medical superintendent, for permission to publish it.

KALA-AZAR IN AN ENGLISH SEAMAN

R. B. THOMPSON, M D DURH, M R C P
MEDICAL REGISTRAR, VICTORIA INFIRMARY, NEWCASTLE-ON-TYNE

THERE are two reasons for reporting the following case of kala-azar in an English seaman. Such cases are likely to give rise to difficulties in diagnosis when met with in a general medical ward, and the patient was treated with a drug prepared by Messrs. Burroughs Wellcome to replace 'Solustibosan' (Bayer) which is unobtainable owing to the war.

An able seaman of 22 years, who had resided in Malta in the course of service in the Mediterranean, arrived in England in March, 1942, via the Cape. It was thought that he was infected with kala-azar in Malta because the disease is rife on that island, and not at any other port at which he was ashore. No symptoms were complained of apart from those of a "cold" and a slight but persistent cough until May, when he had a shivering attack and was admitted to a Royal Naval Hospital. At this time there was a swinging temperature which reached a peak of 103° F., with a rapid pulse and generalised glandular enlargement. Examination of blood-films for parasites, a Paul-Bunnell test and the usual agglutination reactions were all negative. Differential counts were normal.

In June, 1942, he was transferred under Prof. J. C. Spence's care in the Royal Victoria Infirmary, Newcastle. Here his temperature was remittent, and showed a definite periodicity, rising to peaks of 102° F. for 6–10 days and then falling again with peaks of 99°–100° F. for a similar period. The highest temperature recorded was 105° F. during a rigor. Apart from this coarse variation there occurred on several occasions a double, and less often a triple, rise within 24 hr. The pulse-rate rose and fell with the temperature. A soft doughy enlargement of the spleen was noted, and it steadily enlarged until in August pain was felt over it; in this same month the liver was felt to be enlarged. Blood examination showed a progressive low colour-index anæmia with a leucopenia, the lowest white-count being 1700 per c.mm. Differential counts showed a progressive monocytosis, made more apparent by the neutropenia; it was this feature which led to the suspicion that the case was one of protozoal infection. No Leishman-Donovan bodies were seen in the blood-films but they were searched for and found in the sternal marrow. Napier's formol test was positive 16 days after the beginning

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of sodium antimony gluconate treatment. The total serum protein was 9·6%, with albumin 4·56% and globulin 5·04% (by difference). The Wassermann reaction was negative. No urinary abnormality was found. There was no pigmentation and no significant glandular enlargement was noted while the patient was in the infirmary. His weight steadily fell during the illness.

Owing to difficulty in obtaining more recent remedies and the patient's critical condition, a course of intravenous tartar emetic was given comprising gr. 15½ in 15 days. No improvement was noted during this course, the patient being if anything worse. A supply of sodium antimony gluconate was then obtained and one 6 c.cm. ampoule given intravenously daily for 10 days. The temperature fell towards the end of the course and remained normal. The spleen and liver rapidly receded, and the blood-picture returned to normal. No Leishman-Donovan bodies were found in the marrow. There were no toxic symptoms. He was discharged in September to all appearances perfectly well.

While delayed results from tartar emetic are on record, all who saw the case agreed that it was the second treatment which cured the disease, and that the gluconate preparation is one meriting further and better controlled trial. Such trials have been reported by Yates [1] (82 cases), Struthers and Lin [2] (29 cases), and Napier and others [3] (10 cases). They used solustibosan (SDT 561), which is identical with the drug used in the present case. The general opinion is that solustibosan is superior to 'Neostibosan'; Struthers and Lin report that it has cured patients resistant to a full course of the latter drug. It is also more stable, and no significant reactions are reported. Their dosage was similar to ours, but the drug was often given on alternate days. They all state that the cases are as yet too few for trustworthy conclusions and advocate further trial.

For the sodium antimony gluconate, which was supplied in solution in ampoules, I am indebted to Dr. C. M. Wenyon, FRS, director-in-chief of the Wellcome Research Institution. Thanks are also due to Prof. J. C. Spence for permission to publish the case, and to Prof. A. F. B. Shaw for the sternal marrow reports.

1. Yates, T. M. *Chin. med. J.* 1937, **52**, 339.
2. Struthers, E. B. and Lin, L. C. *Ibid*, p. 335.
3. Napier, L. E., Chaudhuri, R. N. and Rai Chaudhuri, M. N. *Ind. med Gaz.* 1937, **72**, 462.

Reviews of Books

Psychological Medicine

A Short Introduction to Psychiatry, with an appendix on War-time Psychiatry. DESMOND CURRAN, MB CAMB, FRCP, DPM, surgeon captain and consultant in psychiatric medicine, RN, psychiatrist to St. George's Hospital and to the Maida Vale Hospital, London; ERIC GUTTMANN, MD MUNICH, LRCPE, neuro-psychiatric specialist EMS. (Livingstone. Pp. 188. 10*s*. 6*d*.)

THIS is not a book for readers whose bias is towards psychopathology and psychotherapy, but as a repository of readable advice and information about day-to-day psychiatry it is an excellent introduction for the practitioner and the practitioner-to-be. The medical student will profit from the factual, simple exposition which does not expect him to be receptive to subtle psychological considerations or ready to balance controversial issues. If it harks back to modes of thought which many nowadays would regard as a little too cut and dried when applied to mental phenomena, this is no doubt done for a didactic purpose. Chapters on causation, symptoms, casetaking and treatment cover the general problems and methods which the doctor should be familiar with; detailed well-knit descriptions of syndromes and reaction-types follow, and there is a final chapter on legal aspects. An appendix on war-time psychiatry occupying nearly a quarter of the book is vivid and practical; the section on psychiatric aspects of head injury is concisely illuminating.

Tuberculosis in Childhood

DOROTHY STOPFORD PRICE, MD DUBL., physician to St. Ultan's Infant Hospital, Dublin. (Wright. Pp. 215. 17*s*. 6*d*.)

THE recent increase in the incidence of tuberculosis particularly among children has stimulated interest in the initial tuberculous infection or childhood type of the disease. The natural history of tuberculosis in all its phases is not easy to grasp, and there are still some gaps in our knowledge, but it is described in the present volume as completely as our knowledge permits, and by one whose clinical experience well qualifies her to speak. Dr. Price has succeeded in appreciably lowering the mortality-rate from tuberculosis in the last 7 years among the children of Dublin. The "classification of stages" is adopted, and this is clearly worked out with due attention to anatomy, especially of the mediastinal glands. Tuberculin testing is separately considered, and chapters on the pulmonary foci and orthopædic lesions by Mr. H. F. MacAuley complete this serviceable work.

Fractures

(4th ed.) PAUL B. MAGNUSON, MD, FACS, associate professor of surgery, Northwestern University, Chicago. (Lippincott. Pp. 465. 30*s*.)

THIS exposition of fracture treatment as applied in Chicago agrees for the most part with views accepted in this country. The opening chapter starts with fundamentals, including valuable information on shock, immediate treatment, transportation and complications in war surgery. Then follow chapters on the pathology of bone repair, method of reduction and splinting; it is interesting to note that the unpadded plaster cast is not described. The body is then dealt with region by region with good illustrations. The hip section, which covers dislocation, is particularly well done, including Magnuson's own operation for fractured neck. Some 70 pages are devoted to spinal fractures, and open operation is advocated when there is evidence of interruption of cord conduction. The section on skull fracture is a little disappointing and facial fractures are not mentioned. The closing chapters on physiotherapy are useful, and the whole book can be recommended to the practising surgeon.

Dynamic State of Body Constituents

RUDOLF SCHOENHEIMER, MD, late associate professor of biological chemistry, Columbia University. (Oxford Univ. Press. Pp. 78. 10*s*.)

THIS volume opens with a memoir of the author who died in tragic circumstances before the lectures could be given. They were delivered and transcribed by Dr. Hans Clarke. The loss of Schoenheimer is a serious blow to biochemistry, since he was responsible for the introduction of a new research technique. He conceived the idea of introducing isotopes such as heavy hydrogen into a compound and then following its metabolism by noticing the path of the isotope; and the method has already given promising results.

Clinical Laboratory Diagnosis

(2nd ed.) S. A. LEVINSON, MS, MD, professor of pathology and assistant professor of medicine, university of Illinois; R. P. MACFATE, CH E, MS, PH D, assistant professor of pathology. (Kimpton. Pp. 980. 48*s*.)

THIS compact volume contains a fund of information for the clinician and the laboratory worker. For the former there is an account of the laboratory findings in various pathological conditions and an indication of the way in which the laboratory can aid in diagnosis with, at the same time, an emphasis on its shortcomings. For the latter, there is an account, both succinct and comprehensive, of the technical procedures in common use with the principles underlying them. The book is well ordered, concisely written and adequately illustrated with 156 engravings and 15 plates. References to the original papers are freely given in footnotes, while in the bacteriological section the classification of Bergey is adhered to. Chapter 16 deals with the special problems of clinical pathology in pædiatrics. In the appendix, in addition to a list of conversion factors, there is a table giving the normal size and weight of the various organs. There are however some omissions: no account is given of seminology, hormone assays are not described and apart from ascorbic acid no reference is made to recent work on the laboratory assessment of vitamin deficiencies. The book, though readable, is essentially one for reference.

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THE LANCET

LONDON: SATURDAY, JANUARY 1, 1944

PERFORATION OF PEPTIC ULCERS

ON another page WAKELEY presents a valuable study of the after-histories of naval patients operated on for perforated peptic ulcer at the Royal Naval Hospital, Haslar, between 1924 and 1934. The number is just over 100. The operative mortality (8%) was gratifyingly low, partly because the average interval between perforation and operation was only 4 hours, and partly because the patients were, apart from their ulcerative disease, relatively fit men of an average age of only 32. Hence the contrast with a control series from the records of King's College Hospital, where the average age was 46, the average interval between perforation and operation 10 hours, and the mortality 20%. The well-known relations between preoperative interval, age, and operation mortality are again exemplified in RAW's report of Newcastle cases on p. 12.

The most striking finding in the naval series is that now, between 9 and 20 years after their operations, 44% of the patients are still serving with His Majesty's forces, and may be presumed to have no incapacitating degree of dyspepsia. The dyspeptic history of the others is not available from naval records, but the conclusion is clear—that past perforation does not necessarily mean that a man is useless to the Services. WAKELEY states confidently that the prognosis in cases of perforation is better than in any other form of peptic ulcer. Although a long and close follow-up study would be needed to prove this statement, it is certainly what anatomical considerations would lead us to expect. When an ulcer lies posteriorly it penetrates the wall of the stomach or duodenum, grows larger by eroding the pancreas or liver, and establishes round itself a zone of fibrous tissue so dense that, however favourable other factors may be, healing becomes nearly impossible; in post-mortem examinations the scars of healed ulcers within the gastric or duodenal walls are common, but evidence of penetration and subsequent healing is rare. The ulcer lying anteriorly, on the other hand, perforates long before its depth or its fibrosis approach in amount those of the penetrating posterior ulcer; then either the patient dies, or he is saved by an operation which for a time at least eliminates his ulcer. This may of course recur, or another may develop elsewhere; but on the whole the ulcer that can perforate is insusceptible, because of its anatomical position, to one of the factors that make for chronicity; and it is also unlikely to erode vessels large enough to bleed dangerously.

Perforation is proof, more striking than exacerbation of dyspepsia, of increased activity of the ulcerative process. It is now four years since DAVIES and WILSON,[1] probing the personal histories of ulcer patients, claimed that perforation is usually preceded by an increase of emotional strain, of a kind commonly associated with increased responsibility, financial difficulty and troubles in the family. One can imagine few more potent cause of anxiety on these counts than frequent air-raids. So it was not surprising that admissions to London hospitals of patients with perforated ulcers were said to have increased during the blitz. In our present issue this observation is securely established by SPICER, STEWART and WINSER, with a statistical analysis of figures from 16 London hospitals from January, 1937, to November, 1942: in the nine months between September, 1940, and May, 1941, the average monthly admission-rate for perforations was 35·1; before and after that period it lay always below 25·5. WINSER and his colleagues have refrained from offering the advice that the middle-aged ulcer patient, when he hears the siren, should drink a glass of milk and go to bed. The glass of milk would be desirable; but bed without sleep is a hotbed for anxiety, and the ulcer patient who in these circumstances does something different from his fellows, for the supposed benefit of his ulcer, only adds fear of his ulcer to the fears for himself and his family engendered by the siren. If he has no appropriate duties to perform he would be better immersed in a game of bridge.

1. Davies, D. T. and Wilson, A. T. M. *Lancet*, 1939, ii, 723.

WOUNDS OF JOINTS

THE nation has been warned to expect heavy casualties, and it is our duty to prepare for them. It should be possible after four years of war to assess the value of present methods of treating wounds, but before this can be done satisfactorily more records of end-results must be provided. BUXTON'S[1] survey of 51 elbow wounds sustained in the third Libyan battle makes it clear once more that sulphonamides must not be regarded as a cure-all: 31 developed suppurative arthritis, and the infection seems to have been severe, for 17 ended in complete ankylosis, and 5 with movement less than 30° He does not discuss the bacteriology of these joint wounds, but there as elsewhere the inhibition of streptococci by sulphonamides may have increased the relative importance of the staphylococcus. The latter is becoming, or has become, the main problem. Examining a mixed group of 192 wounds in the El Alamein campaign, PULVERTAFT[2] found staphylococci in almost 70%; in a small series of brain wounds CAIRNS[3] reports a similar flora; and BODENHAM[4] notes that in burns and surface wounds the incidence of *Staph. aureus* is almost 100%. Penicillin is capable of eliminating the staphylococcus—though SCOTT-THOMSON[5] mentions a disturbing 5% of penicillin-resistant *Staph. aureus*—but only if it can be brought into contact with the organism in adequate concentration. A joint is a complex cavity, and it is difficult for the drug to reach all the pockets. As BODENHAM[6] points out, surgery may be needed to facilitate its application.

More bacteriological information is also required to show how often the joint infection starts in the superficial layers and then spreads inwards; for CAIRNS has demonstrated that most brain-wound infections begin in that way. In the last war DUVAL and others found that in joint wounds there was no

1. Buxton, St.J. D. *Lancet*, 1943, ii, 663.
2. Pulvertaft, R. J. V. *Ibid*, p. 1.
3. See *Lancet*, 1943, ii, 705.
4. Bodenham, D. C. *Ibid*, p. 725.
5. War Office Report on Investigation of War Wounds. See *Lancet*, 1943, ii, 742.
6. See *Lancet*, 1943, ii, 639.

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synovial infection for at least 24 hours, and often it was 60 hours before infection developed.[7] Early sterilisation of the superficial tissues may thus be particularly important, and it is likely that a penicillin-sulphonamide powder will come to be used as the early first-aid measure as soon as supplies are available. Against the secondary invader, or "hospital infection," the closed skin is the best bulwark. "Never primary suture the war wound" is a Service order that may need adjusting in the light of the work with penicillin.

TRUETA[7] advocates primary suture of the joint wound provided it can be done within 12 hours. Besides skin closure he also recommends suturing the synovia with a fine running catgut stitch if at all possible (it is only occasionally possible in an elbow wound). BUXTON gives no advice on this point, for nearly all his series were operated on 24 hours or more after wounding. At times one specialty may learn from another, and the neurosurgeon's experience in North Africa is instructive. In different circumstances of war EDEN[8] was able to operate on 188 out of 293 head wounds within 24 hours of the injury, and on all but 34 of the remainder within 72 hours. After careful surgery and suitable plastic measures all the wounds were primarily sutured, draining only by means of a stab-wound for 48 hours. In no part of the body could even a mild enclosed infection be fraught with greater risk; yet 97% of the surviving cases healed without serious complication. Those who urge the need for suture of the synovia will note that no attempt was made to suture the dura. In the late case, BUXTON emphasises the importance of adequate drainage, and he has been impressed by the better results where the olecranon had been excised—some cases "regained up to 70° flexion-extension mobility, and half the supination-pronation movement." The wounding missile does not always pick the most suitable spot for subsequent drainage, and GIRDLESTONE[9] advocates deliberate excision of the olecranon for drainage. The Russian surgeon employs a fuller excision of the joint, and the French in this war (following LERICHE in the last) have also favoured the more radical excision of damaged bone fragments. But the lower end of the humerus is richly clothed with vascular muscle, and sequestration was uncommon in BUXTON'S cases. WATSON-JONES[10] too is against joint resection, and writes, "a striking feature of surgery in this war is the excellence of function and the free mobility regained after treatment of penetrating joint injuries by early excision of the wound (not resection of the joint) and immobilisation in plaster."

TO obtain "enforced, uninterrupted and prolonged" rest for the elbow-joint, according to THOMAS'S dicta, a shoulder spica is necessary, but in the Middle East transport difficulties and climatic conditions made this impracticable, and in BUXTON'S cases the elbows were immobilised in a plaster extending from the axilla to the metacarpal necks and supported in a sling. In the last war, following the advice of WILLEMS[11] of Ghent, it was the custom to make patients with joint infections move their joints early; but movement is now wholeheartedly condemned; in the words of THOMAS, "it would indeed be as reasonable to attempt to cure a fever patient by kicking him out of bed, as to benefit joint disease by wriggling at the articulation." BUXTON recommends fixation of the elbow at a right angle, in full supination (spit-into-your-hand position); other orthopædic surgeons prefer a more obtuse angle and the mid-position. Two of his series had amputations performed because of the extent of the wounds; but he holds that destruction of tissue alone is rarely an indication for amputation, and the MRC *War Memo-No. 5* regards irreparable interference with the blood-supply as the main indication, extensive local damage being a very rare one. A flail elbow can usually be stabilised later, either by operation or with a suitable appliance.

There was remarkable recovery of the nerve lesions in these cases, which speaks well for the carefulness of the primary surgery; 16 nerves had been injured and 14 recovered without operation. At the British Orthopædic Association meeting, W. ROWLEY BRISTOW drew attention to this tendency of nerves to recover, and described a case where flexor tendons of the forearm had been transplanted into the extensor muscle group for an apparently irrecoverable lesion of the radial nerve. The patient was invalided home, and the surgeons there were presented with a new problem; for in the meantime the radial nerve had recovered.

TRIAL AND TREATMENT

THE punishments appropriate to the delinquent child have been given a thorough airing over the case of Denis Craddock at Hereford. The case was managed in accordance with existing legislation, as Lord Justice GODDARD'S report showed. Criticism of this legislation is chiefly based on the fact that a court of first instance, under the guidance of magistrates not specially trained in the law and not necessarily deeply conversant with the springs of human behaviour, has the power to order segregation of a child and commit him to guardianship or to an approved school for a period of years, as well as punishment by birching. At a conference in London a few weeks ago the National Council for Civil Liberties proposed a revision of this system, and especially the abolition of birching. Miss MARGERY FRY quoted the Children Act of 1933, which directs the courts "to consider the welfare of the children." Not trial and punishment, then, but trial and treatment is the aim. In the light of this it is worth while examining the results of the measures which magistrates have the power to impose—namely, probation and boarding out under guardianship, residence in an approved school, and birching.

The results of probation, guardianship, or residence in an approved school are generally agreed to be favourable on the whole. Thus EAST and HUBERT[1] quote a Home Office inquiry showing that of 2311 probationers more than 70% had satisfactory records 3 years after probation, and of 8000 children in approved schools 84% were satisfactory three years after leaving. This, however, means that for a quarter or more of the children who get into court existing methods of treatment have not been a

7. Trueta, J. Principles and Practice of War Surgery, London, 1943, p. 275.
8. Eden K. *Lancet*, 1943, ii, 689. 9. Girdlestone, G. R. *Ibid*, p. 593.
10. Watson-Jones, R. *Brit. med. J.* 1943, ii, 276.
11. Willems, M. Official Medical History of the War, Surgery, vol. II, p. 299.

1. East, W. N. and Hubert, W. H. de B. The Psychological Treatment of Crime. HMSO, 1939, p. 15.

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success—a proportion which might be reduced, even though Mr. H. MORRISON finds himself satisfied with the principles on which young offenders are at present dealt with. But in any case the juvenile offender tends to settle down. BARTON HALL,[2] studying 1500 young people between the ages of 10 and 20, referred for mental, nervous or allied disorders to a psychiatric centre, found that in 31% the patient was suffering from mental conflict manifesting itself in conduct disorders and delinquent acts, many of them leading to the juvenile court. She anticipated a favourable prognosis in only a third of these, yet two-thirds made a complete recovery.

The Hereford case has demonstrated that on the letter of the law a child may be segregated from his parents from the age of 11 until he is 18, and that he may be lodged at some address which his parents do not know. In putting a child under guardianship the court places him under the care of a "fit person"—in this case the education authority. The Hereford authority placed Craddock in a good foster home, but followed the undesirable course of keeping the address from his parents. This is not a usual or universal practice, and is certainly not in accordance with the spirit of the Home Office regulations. In making the commitment to the age of 18 the magistrates had no option: that is the only sentence open to them. In practice it can readily be remitted and the chances are that the boy would have been home again as soon as sufficient time had elapsed to break up the gang activities in which he had taken part—probably in a year or two. Nor is a boy, when committed to an approved school, completely segregated from his parents or the world. The regulations run [3]:

> Boys shall be encouraged to write to their parents at least once a month and for this purpose postage stamps shall be provided, if necessary, by the Managers.
>
> Boys shall be allowed to receive letters from their parents, relatives and friends, and, at such reasonable intervals as the Managers may determine, visits from them.

If a boy's behaviour is good he can get home for holidays and short periods, the length of his stay in the school being conditioned by his behaviour. Censorship of letters to and from parents varies in different schools, but it seems unreasonable to expect children to learn to respect private property unless the authorities set an example.

So much for the special training of delinquents away from home, which gives reasonably good results. There remains birching; and here the evidence is equally clear-cut. The Departmental Committee on Corporal Punishment (1937–38) quoted figures showing that 25% of children who were birched were charged again within a month, 76% within two years. In one Scottish town 133 boys were birched during 1934 and 1935 and 36% were again charged later. The committee recommended the abolition of birching and flogging as penal measures; yet since that time the number of birchings has risen from 48 in 1938 to more than 300 in 1942. It is not quite clear why this should be so, unless because birching is a cheap and easy measure to apply in war-time. Delinquency has shown no commensurate increase, having gone up by only 3 per 1000 since the outbreak of war. In any case there is no evidence that birching is a cure for the complex resentments and frustrations usually associated with delinquent behaviour; informed opinion in our columns has invariably been to the opposite effect—if you birch a bad boy you make him worse. Thus RACKHAM,[4] like other experienced magistrates, has found that a boy punished in this way is nearly always back in court within a few weeks; at a Eugenic Society's luncheon last year she quoted CYRIL BURT that birching nearly always makes the delinquent at once more defiant and more furtive. CARROLL,[5] speaking at a meeting of the Medico-Legal Society in 1939, said that the effect of punishment—he did not specify what form of punishment—was not easy to forecast, but that in some types it is disastrous, and that the serious juvenile offender is generally better treated without it. Nor is there any evidence that the results to be expected of corporal punishment vary with the intelligence of the child; that it is successful, for example, with the dull and stupid, though unsuited for the intelligent. BODMAN [6] reports that birching has not the deterrent effect on dull children (IQ less than 85) commonly attributed to it, since in many cases such punishment has been administered as often as four or five times over as many weeks, without any benefit to the child's behaviour. These are admittedly opinions, but they are based on wide experience.

It is no uncommon thing for public opinion in this country to run ahead of the law; one example was the growing unwillingness of juries to convict at the time when hanging was the penalty for petty theft. Birching seems to be an inept penal measure which needs revision. In practice, the Hereford case may render it a dead letter, for it has made clear to parents their right to appeal. The time allowed for appeal is 14 days, and, as the learned judge pointed out, nothing could be worse for a child than to have a whipping hanging over him for a fortnight. The responsibility of exposing a child to this risk is not one to be taken lightly.

CONTROL OF CANCER

AT the British Empire Cancer Campaign's meeting on Dec. 14 Prof. E. C. DODDS, FRS, made an arresting speech. His statement of the difficulties confronting a system of research that depends on benevolence could scarcely be bettered. In Great Britain there is no direct state subsidy for cancer research, though a trickle may find its way thither indirectly. Cancer research is a charity; and a charity cannot thrive unless its donors are convinced that their gifts are bearing fruit. Professor DODDS believes that in these circumstances the public should be given a picture of cancer research as it really is. So far all will agree. Either the public must understand the problems that research confronts, or else responsibility for attempting their solution must be delegated to the state. To give the picture to the public is not easy; but it is not impossible if the experts are clear in their own minds about where they agree and where they differ. The treatment of prostatic cancer provides a useful illustration of the need for clarity, for the comments Professor DODDS made on control of this condition reveal a difference of outlook from that of the practising surgeon on the one hand and that of the iconoclastic bench-worker on the other.

2. Barton Hall, S. and M. *Lancet*, 1942, i, 377.
3. Statutary Rules and Orders, 1933, no. 774, para 31.
4. Rackham (Mrs.) C. D. *Lancet*, 1942, i, 536.
5. Carroll, Denis, *Ibid*, 1939, ii, 22.
6. Bodman, F. H. *Ibid*, 1941, ii, 572.

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Like all other diseases cancer combines a basic pathological alteration with pathological symptoms. In no disease is there greater identity of basic pathological alteration; in few is there greater diversity of symptoms. The identity rests on three solid observations—that cancer is a disease of cells; that these diseased cells carry their own stimulus to divide; and that when they divide they reproduce their own kind. This is no mere theory or working hypothesis; it is a truth verifiable by any moderately skilful person who combines alternate microscopy and transplantation of tumours. Symptoms on the other hand depend on the local or centrifugal malignancy of cancer, on the site of origin, on the tendency to spread, and on the anatomical paths of spread. Even the presence of pain is inconstant. In addition, the cachexia sometimes associated with tumours may be attributable to anæmia, to chronic intoxication with metabolic products, to secondary bacterial invasion, or even to the secretions of a differentiating neoplasm.

Prostatic cancer is often cancer in one of its most terrible forms. Starting as a relatively small tumour it may soon interfere with bladder function; it may then spread widely and rapidly; it is extremely painful, emaciates the patient and may even paralyse him; it leaves him without appetite or desire to live. To see these symptoms removed, appetite for food and life restored, and the patient once more a useful citizen is a dramatic experience; and to have reached this stage in treatment is a great achievement. In a comprehensive summary of much of the work which has preceded this important advance in therapy, HUGGINS [1] of Chicago says that either castration or administration of œstrogenic substances will bring about this relief in a large number of patients.

"It must be emphasized," he adds, "that the results are not uniformly successful and they fall into three groups; one group, less than 5 per cent. of patients, received no or slight benefit from endocrine treatment; the other groups, larger and nearly equal in number, obtained respectively an improvement pronounced but unsustained (less than 18 months) or a pronounced and more prolonged regression of the disease."

Nowhere has HUGGINS stated that the disease was cured, though he believes the benefit is more than palliation. Independent workers in other centres [2] have confirmed the relief of symptoms. The fact that a cure of this disease—a saving of lives—has not yet been claimed by any surgeon, does not detract from the value of alleviating symptoms so severe.

If on the subject of saving life the surgeon differs from Professor DODDS, no less will the bench-worker differ on the meaning of the control of cancer. The three basic discoveries we have already mentioned are no longer disputed, and divergence of opinion now concerns the stimulus to divide, which the cancer cell carries within itself. The nature of the stimulus and the way in which the alteration comes about may still be debated. But whatever the answer to the questions may be, it seems unlikely that cancer, the disease, will be controlled until that stimulus is neutralised or the apparatus—the nucleus—through which it works, has been made inactive. In the meantime, and until some method of controlling basic causes is discovered, our aim must still be removal of the cancer cell.

1. Huggins, C. *Science*, 1943, **97**, 541.
2. Annual Report of the British Empire Cancer Campaign, 1943; see *Lancet*, 1943, ii, 806.

Annotations

NEW LEAVES

THE paper situation being a little easier, we begin the New Year by giving many new subscribers a chance to turn over new leaves every week. We trust that, like leaves on another occasion, they may indicate recession of a deluge. Most of our new readers are in the Services; and foremost in their minds, as in ours, are the efforts remaining to be made before, like Noah and his family, they can begin to restore and replenish the earth. Nevertheless we cannot suppose that conversation in the Ark was confined, to immediate discomforts—grave though they must have been. The prospects of 1944 make it not only proper but also necessary to discuss in detail the requirements of peace; and a new section of this journal, headed Reconstruction, will be devoted to proposals for making each new year an improvement on the last.

TRENCH FOOT

SNOW is falling on the Russian and Italian fronts, and the armies are again exposed to frostbite and trench foot. The latter, like immersion foot in sailors, follows long-continued chill rather than exposure to extreme cold, and in the west it is the more important to troops. The dry air usually associated with very low temperatures is a poor conductor of heat. It was found in Flanders, Gallipoli and the Balkans during the last war, that the humid airs of oceanic climates, the slush of mountain sides, the deep mud of trenches hastily improvised and improperly drained, are the chief dangers, abstracting heat more rapidly from the feet and hands because of the high thermal conductivity of water.

The prophylaxis of trench foot has been described in this country by Greene [1] and in Russia by Sarkisov-Serasini.[2] Provided an army is well equipped and both officers and men understand the risks and how to combat them, the incidence of cryopathies provides an index of discipline. It is the army in retreat, low in morale and with its communications in disorder, that suffers most severely. In preventing casualties from this cause, the MO shares his responsibility with his fellow officers. So far as may be possible, clothes should not hinder the circulation; socks should be loose and undarned; boots should be well fitting, soft and of ample size; ski bindings should not constrict the toes. Dry socks should be carried and wet ones changed at every opportunity. Provision should be made for the drying of boots and other clothing. Hot meals should be provided. Habits of immobility must be countered and the venous return from the feet aided by constant muscular activity on duty, and by elevation of the legs at rest. Sarkisov-Serasini especially emphasises the need to keep the feet clean and to free them from the epidermophytosis with which almost every soldier is afflicted. In the British Army in 1914–18 attention was drawn to the frequency with which sepsis, then the most serious complication of trench foot, began in areas abraded by ill-fitting boots or denuded of the horny layer by the fungus of "athlete's foot." A recent German paper has commented upon the importance of sweaty feet as a predisposing factor; sweat not only conducts heat but favours epidermophytosis. Sarkisov-Serasini recommends frequent washing with soap and water followed by dusting with a powder consisting of salicylic acid 2, alum 8, lycopodium 5 and talc 20 which should also be blown into the boots. For developed cases of epidermophytosis, every doctor has his favourite remedy.

The onset of trench foot may be insidious and only careful watch by every officer ensures that cases are

1. *Lancet*, 1940, i, 303; 1941, ii, 689.
2. The Elements of Physical Training and the Prophylaxis of Frostbite, Chapter 9, Moscow 1941.

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detected at the earliest stage when damage may still be avoided. "Then," wrote Napoleon's surgeon Larrey, "woe to him who numb with cold . . . approached too near to the camp fires." To the numbed feet or hands no warmth must come greater than that of the human body. Limbs once affected should be kept as cool as possible while the rest of the patient is warmed; never must they be rubbed, for the chilled or frozen skin is too delicate for such harsh measures. First-aid consists in protection from further damage by heat or movement or infection.

During the first part of the Finnish-Russian war a Finn visiting this country was asked how frostbite was treated in the Finnish army. "In the Finnish army," he replied, "frostbite does not occur." This, as a matter of fact, is untrue; but the pardonable exaggeration teaches a useful lesson. Given good equipment, frostbite and trench foot on land are usually the result of carelessness.

ATTITUDES TO EPILEPSY

FROM ancient times epilepsy has probably excited more respect than it deserves. Its old appellation of the "sacred disease" was an example of that defensive magic by which the inexplicable must be sanctified and thus propitiated. Yet in general it is no more than an inconvenience, alarming to onlookers but not grossly distressing to the patient. True some epileptics are mentally defective, some deteriorate intellectually, some are hysterical or otherwise psychopathic, and a few have fugues or other epileptic equivalents. But a great many of them simply have their fits, and get on with their lives no worse than anyone else; and there are plenty of examples to show that epilepsy is not incompatible with ability, or even with genius. Last year the Laymen's League against Epilepsy, was incorporated in America with the aim of creating a practical and healthy attitude to the disorder among epileptics and those with whom they are associated. Some accounf of its work is given in a delayed issue (Dec. 1942) of *Epilepsia*, the journal of the International League against Epilepsy, which has just reached us. Epileptic children often feel they are stigmatised, and are thus at a disadvantage among their schoolfellows. Mrs. Brooks Potter, president of the LLAE, writes that they are encouraged by the league to speak frankly of their attacks in some such words as: "Why yes, I have epileptic seizures, but I am taking the very best medicine the doctors know of. If only they can get more money for research there is every chance of their discovering the cause and cure." School teachers too are encouraged to take a sensible view of the condition, and parents are helped to avoid too much solicitude and to understand the despair which is usually at the bottom of defiance or unruliness in an epileptic child. She notes that members are now to be found in the United States, Australia, Canada, South America, and South Africa. It is an old story that the patient knows more about his disease than anyone else, and this league could hope to contribute to the understanding of epilepsy even if membership was confined to epileptics; actually membership is also open to doctors, and to friends and relatives of patients. The treasurer's office of the LLAE is at 50, State Street, Boston, USA.

CHEMOPROPHYLAXIS OF RHEUMATIC FEVER

PROPHYLACTIC doses of sulphadiazine have given encouraging though not entirely conclusive results in cutting short an epidemic of scarlet fever,[1] but the chemoprophylaxis of acute rheumatism by giving small doses of a sulphonamide throughout a whole winter is a different matter. In several well-controlled trials[2] considerable and even brilliant success has been attained with sulphanilamide, but long-continued administration of this drug is a tricky business requiring close observation and many exact laboratory estimations of hæmoglobin, red and white cells, sedimentation-rates, antistreptolysin titres and drug-concentration levels as well as typing of hæmolytic streptococci from throat swabs. Such an experiment in a home for rheumatic children has been described by Kuttner and Reyersbach.[3]

About half the children, 108 in number, were given 1–2 g. of sulphanilamide daily in three divided doses from October to June, 1941 and 1942, the other half acting as controls. Among the treated children only 2 contracted streptococcal upper respiratory infections, and only one of these showed signs of rheumatic activity. In contrast, among the 104 controls, 48 contracted streptococcal pharyngitis and 23 of these had definite and 5 possible rheumatic relapses. No rheumatic relapses were observed in children who escaped streptococcal upper respiratory infections, and this in the observers' view provides definite confirmatory evidence of the importance of *Strep. pyogenes* in the ætiology of rheumatic fever. The incidence of toxic effects of the drug in this experiment was as high as 15%, and included fever, erythematous and urticarial rashes, and leucopenia (3 cases). These effects appeared from the 5th to the 35th day after beginning medication, and necessitated in each case the immediate stoppage of the drug. In 9 of these children an attempt was later made to re-start the drug, but in 7 of them symptoms of intolerance again appeared. However, 3 out of 4 were able to tolerate sulphadiazine. All the remainder of the children tolerated the drug well. No serious toxic effect occurred in this experiment, but Stowell and Button[4] in a somewhat similar series reported fatal agranulocytosis in a boy of 12 years.

No complete success for this method can be claimed until it has been applied to rheumatic patients every winter throughout childhood, adolescence and even young adult life. This is a formidable and generally impracticable undertaking. For the present, the use of the method should probably be confined to patients with severe rheumatic heart disease. Possibly our knowledge of the relationship of streptococcal infections to rheumatic fever may lead to new antistreptococcal methods based on biological reactions rather than on chemotherapy.

PLANNING FOR POPULATION

THE new Royal Commission on the Birth-rate will have to decide, among other things, whether the country's interest will be best served by a larger or a smaller population. Dr. J. A. Fraser Roberts, addressing the Eugenics Society on Dec. 14, had no doubt that public opinion is largely in favour of an increase in population, and even hinted that any other view is decadent. In his opinion a decline in population will mean a decline in quality, since it chiefly affects the more intelligent sections of the community. He did not, however, state his criteria of intelligence. If, as seemed implicit in his argument, he regards the professional classes as more intelligent than the artisans, and the artisans as more intelligent than the labourers, the issue is less clear than it may seem; for who is to say—without exhaustive investigation—that the professional group entered their careers because they were intelligent, and not because they and their parents were relatively infertile? Generally speaking only parents with few children can afford to give them a professional education; and the young person determined to do well in a profession generally has to postpone marriage. Indeed, as he pointed out, intelligence itself may to some extent be biologically associated with infertility, partly because those with a wide range

1. See *Lancet*, Oct. 2, 1943, p. 421.
2. Coburn, A. F. and Moore, L. V. *J. clin. Invest.* 1939, **18**, 147; *Med. Clin. N. Amer.* 1940, **24**, 633; *J. Amer. med. Ass.* 1941, **117**, 176; Thomas, C. B. 1941, **116**, 551.
3. Kuttner, A. G. and Reyersbach, G. *J. clin. Invest.* January, 1943, p. 77.
4. Stowell, D. D. and Button, W. H. jun. *J. Amer. med. Ass.* 1941, **117**, 2164.

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of interests have less attention to spare for the getting and rearing of children. If this is so, it is right to inquire into all the reasons for this relative infertility; it may have biological advantages not so far understood. Dr. Roberts's solution would be to encourage larger families throughout the community; and to equalise differences by removing the economic sanctions that make it an advantage to be born into a small family. Family allowances, he thinks, might encourage this change, and should be partly in the form of services to the children; in the higher-income groups relief should be applied by reducing taxation. At the same meeting Mr. Richard Titmuss pointed out that economic troubles can certainly affect fertility through the medium of contraceptives; thus in an industrial area which had a high birth-rate while prosperous showed a fall of 16% in twelve years when unemployment became serious, as against a fall of 2% in an area not so hardly hit.

This discussion hinted at the scope of the investigation facing the commissioners. In studying the present situation they will have to decide, for example, whether the decline is due chiefly to contraceptives or whether some biological factor is at work. Dr. Roberts quoted figures showing that in the United States differences in the birth-rate between town and country, rich and poor, had the same relative pattern in the eighteenth and early nineteenth centuries (when the use of contraceptives was presumably less widespread) as they have today.

SULPHONAMIDES AND PLASMA PROTEINS

IT has long been known that sulphonamide compounds are not uniformly distributed between the cells and plasma of the blood, or between the plasma and cerebrospinal fluid (CSF), and that some sulphonamides were distributed more unevenly than others. Thus in a typical specimen of human blood, if the concentration as measured in the whole blood is taken as 1·0, the concentration in the plasma will be 0·8 for sulphanilamide, 1·0, for sulphapyridine 1·15 for sulphadiazine and 1·17 for sulphathiazole. Since the corpuscles occupy about a third of the volume of the whole blood, a simple calculation shows that the concentration of sulphanilamide in the corpuscles is 1·8 times that in the plasma, that of sulphapyridine 1·0, that of sulphadiazine 0·61, and that of sulphathiazole only 0·57. The relatvie distribution of sulphonamides between the blood and CSF seldom reaches stable equilibrium, for the concentration in the blood is usually rising or falling and the corresponding changes in the CSF lag several hours behind it; hence, the ratio between the two shows great variation. Allowing, however, for irregularities, the typical distribution between CSF and blood (blood being 1·0) is sulphanilamide 0·60 or more, sulphapyridine 0·60, sulphadiazine 0·50 and sulphathiazole 0·25.

The cause of this uneven distribution appears to be the binding of part of the sulphonamide to the plasma protein, as has been described before in these columns. Accordingly much of the sulphonamide is not free to diffuse through membranes, such as the red-cell envelope or the blood-CSF barrier, which do not permit the passage of protein. A description of the whole phenomenon has lately been given by Davis.[1] The compounds are bound to the albumin of the plasma only, and not to the globulin or to the lipoid complexes present. The percentage of compound bound is proportional to the amount of protein in the plasma but inversely proportional to the blood concentration of the compound, a lower percentage (but greater absolute amount) being bound if the blood concentration is high. With a plasma concentration of 10 mg. per 100 c.cm. the proportion bound is 5% for sulphanilamide, 10% for sulphapyridine, 21% for sulphadiazine, and 55% for sulphathiazole. The binding is not significantly affected by temperature (5–37° C.), and it does not depend upon the native integrity of the protein, for it persists after denaturation by ultraviolet light. The amount bound is increased by making the plasma alkaline, especially in the case of sulphathiazole, and decreased by making it acid; this may explain how so little sulphonamide is lost in the first stage of the Marshall test, when the proteins are precipitated by trichloracetic acid. Calculations show that the active distribution observed between blood and CSF are closely similar to what would be expected if the CSF were assumed to be equivalent to a protein-free filtrate of the plasma. The various distributions between erythrocytes and plasma are not so well explained.

The nature of the binding is obscure; but the manner in which it varies with the acidity or alkalinity of the medium suggests that it may depend upon electrostatic attraction to positively charged regions on the protein surface. In other words, the sulphonamide compounds behave like anions which are attracted to basic groups, such as $-NH_2$, on the protein. In this connexion it may be noted that there is a close parallelism between the extent to which the various sulphonamides undergo anionic dissociation at the reaction of the body and their relative bacteriostatic activities.[2] It seems that the compounds are active against bacteria only when they are in the anionic state; and sulphathiazole is so much more active than sulphanilamide because at pH 7·4 (the reaction of the body) almost all the sulphathiazole is converted into anions, while only a small part of the sulphanilamide is thus converted.

From the clinical standpoint, the most important question is whether sulphonamides thus bound to proteins are active against bacteria or not. Preliminary experiments with *Bact. coli* in vitro suggest that the "bound" sulphonamide is not bacteriostatically active. If this is so, the therapeutic activity of the different compounds cannot be deduced from a knowledge of their blood concentrations and of their relative bacteriostatic activity in vitro, measured usually in protein-poor media. On the other hand, the chief sulphonamides—sulphanilamide, sulphapyridine, sulphathiazole, and sulphadiazine—have now been in use so long that our opinions about their therapeutic value are amply based upon adequate clinical comparisons; they no longer rest upon the theoretical foundations which have now been undermined.

PRESSURE DRESSINGS

AN early and striking change in a burn is the rapid outpouring of fluid from the blood-vessels in and beneath the injured skin. The epidermis is lifted to form blisters, and the affected region rapidly swells. Both these changes are easily seen in burns of the extremities, though they may occasionally be absent when the burn is particularly severe and the whole dermis fixed in a hard unyielding mass. Experimentally Leach, Peters and Rossiter[3] have shown that the amount of fluid in a piece of skin that has been mildly burnt may increase by as much as 50% within half an hour of the injury. These local changes are rapidly reflected in hæmoconcentration, which is the salient feature of burn shock. Fortunately this condition is readily amenable to treatment by serum or plasma transfusions, which have reduced the mortality of burns in the early stages. Many cases however succumb later to the results of serious burn infection.

It would no doubt be better to prevent hæmoconcentration by an appropriate form of local treatment, though in some circumstances it is easier to transfuse a patient than to apply any but the simplest local dressing. Yet to cover the burn early and keep its surface as dry as possible by preventing exudation goes a long way towards preventing infection. In a note on Rossiter's

1. Davis, H. B. *J. Clin. Invest.* 1943, **22**, 753.

2. Bell, P. H. and Roblin, R. O. jun., *J. Amer. chem. Soc.* 1942, **64**, 2905.

3. Leach, E. H., Peters, R. A. and Rossiter, R. J. *Quart. J. exp. Physiol.* 1943, **32**, 67.

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paper (p. 9), Peters pleads for a new outlook on the first-aid treatment of burns. Rossiter shows that a relatively low external pressure on the surface of an experimental burn materially limits the œdema which would otherwise develop. This limitation was significant even when pressure was applied for either the first or last 3-hour period of observations extending over 6 hours. He used rabbits and guineapigs, with essentially similar results in both. The pressures needed to cause the same percentage reduction in œdema were higher in rabbits. The coagulants most popular in modern burn therapy were without effect in preventing œdema of the skin, though they did control the surface loss of fluid, which can be a significant factor in extensive human burns.

Before advocating a new type of dressing based on these findings it is necessary to know more about the pressures needed to control œdema in man. In the meantime it is worth considering the use of rigid plaster-of-paris casts. Plaster casts should not be classified as *pressure* dressings, since to use pressure, or to seem to suggest its use, in applying a plaster cast would be courting disaster. When plaster is used in a fresh case of burns the exudation from the vessels is finally controlled by the internal pressure developing as a result of the continued swelling of the limb. To reduce such swelling to the minimum the cast must be close-fitting, and padding provided only at the recognised pressure points. The use of closed plaster casts for the treatment of burns has been described by Levenson and Lund [4] in America. Unlike Barnes [5] who used the same method, they do not insist that the limb must be kept raised. Barnes found that pain developed in a fresh burn enclosed in plaster unless the limb was suspended. The swelling of an injured limb is not by any means perfectly controlled by simple enclosure in a rigid plaster cast, and the danger of ischæmic gangrene from pressure developing within the cast is stressed by every surgeon writing from the battle fronts; they insist that every cast must be split before the patient leaves the advanced hospital. The reason for the continued swelling is not clear, for considerable pressure must develop in order to occlude completely the arterial supply to a limb.

The use of true pressure dressings in burns has been described by Allen and Koch [6] and by Siler and Reid [7] who claim success from them. This type of dressing requires many pairs of hands to apply it, and the material used is bulky, whereas plaster-of-paris is cheap and plentiful and easy to transport. It is wrong to suppose, however, that almost anyone can apply a plaster cast satisfactorily. The disasters that may follow unskilled application of even a relatively simple plaster remain evergreen in the minds of many orthopædic surgeons. Patients in extensive plaster casts need specially skilled nursing, and in its absence sores deeper than the worst burn may develop. For first-aid or use in the battlefield, an elastic type of dressing as visualised by Peters may prove useful. It must be devised so as to reduce to a minimum the human factor necessary for its correct application. Any pressure in excess of that needed to control exudation will be both dangerous and painful for the patient.

Gallagher [8] describes various types of compression dressings made of gauze enclosing mechanic's (cotton) waste, which "from the standpoint of resilience . . . is the one adequate substitute for the unobtainable sea sponge." A small type, for first-aid kit, need occupy only as much space as a cigarette packet, but when released provides either a sponge-shaped dressing covering, in great depth, an area 4 × 4 in. or a flat dressing covering 36 sq. in. A pack for treatment of extensive wounds and burns consists of sixteen sterile pads 9 in. square, each holding 8 oz. of waste; four of these have 5 yards of 5-inch stockinette bandage attached. It also contains two operating caps and three face-masks (one for the patient). The final container will be a tin 8 × 8 × 8 in. and "in this small cube there will be adequate, smooth, soft, compressible, sterile surgical pads and elastic bandages to cover 1296 square inches of body surface." In Gallagher's view, large surface wounds such as burns need immediate compression to prevent escape of fluid into the tissues (which induces oligæmic shock) and local anoxia and stasis (which may kill the cells and favour infection). His dressings "serve to control bleeding without the use of the tourniquet, give compression therapy to the wound area, bring about a splinting effect to the wound, so pad an extremity that a hard rigid splint can be applied without further padding and give protection from outside contamination by the sterile bulk of the dressing." On arrival at hospital the "definitive" first-aid dressing is if possible left undisturbed, the main object being to bring the patient through the critical period alive, "leaving well enough alone."

4. Levenson, S. M. and Lund, C. C. *J. Amer. med. Ass.* 1943, **123**, 272.
5. Barnes, J. M. *Brit. med. J.* 1943, **1**, 408.
6. Allen, H. S. and Koch, S. L. *Surg. Gynec. Obstet.* 1942, **74**, 914.
7. Siler, V. E. and Reid, M. R. *Ann. Surg.* 1942, **115**, 1106.
8. Gallagher, J. L. *J. Amer. med. Ass.*, Nov. 13, 1943, p. 675.

WHO HEARD THE BROADCAST?

THOSE who listen to war-time broadcast appeals must sometimes wonder whether they do much good, or whether most of the nation, with a sneaking feeling of guilt, turns the knob to another station as the appeal is announced. It therefore reflects agreeably on human nature to learn what very large sums are sent in response to these appeals. In 1939 a total of £171,657 was collected; in 1942 £195,112; and up to Oct. 31 this year the total had reached £202,589. Hospital appeals have done well; the first, on behalf of voluntary hospitals by Gracie Fields in 1939, brought in £19,443. An appeal by Donald McCullough on behalf of the Prince of Wales's Hospital, Plymouth, exceeded all records for a a provincial hospital appeal. These findings confirm the impression that people are ready to share their goods when their imagination is touched by a clear picture of the need. The Central Appeals Advisory Committee have been responsible for recommending subjects to the Week's Good Cause, during war-time, and they have done their choosing well.

WASTE OF INFANT LIFE IN SCOTLAND

IN the New Year Scotland is facing with new heart the age-long problem of labour in vain. On the standard of Holland or of New Zealand the mortality in the first month of life should be lower by 30%, and in the remainder of the first year it should be reduced by 75%. That would mean an annual saving of 3640 Scots lives. Add 1570 unnecessary stillbirths and the saving would be 5210. The solution is social rather than strictly medical—it is Hood's trilogy of poverty, hunger and dirt that cries aloud. North of the Border the proportion of people living in poverty is twice as high as south of it, overcrowding is six times as great, while unemployment is commoner; and all these factors combine to make infection more likely and more deadly. Of course the medical services have not been all they should have been, maternity beds have been too few and the training of midwives and obstetricians imperfect. But at root it is a medico-social rather than a socio-medical problem, for which, as Mr. Johnston says in his foreword,[1] remedies and alleviations can be found and applied by local authorities, medical practitioners and associations of men and women of goodwill. Success is well within the grasp of a community which has produced a Ballantyne and which is credited with a sense of values and a flair for education.

1. Infant Mortality in Scotland: report of a subcommittee of the Scientific Advisory Committee. Department of Health for Scotland. HMSO. Pp. 84. 1*s.* 3*d.*

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Reconstruction

THE PATTERN OF HOSPITAL PLANNING

H. H. MACWILLIAM, MB RUI, D P H

THE unit of the hospital service should ordinarily be the large general hospital. The advantages which general hospitals have over special hospitals are now widely recognised. They can provide the resources of staff and equipment required by most of the patients likely to be found in any area and they form convenient centres in which the clinical and administrative problems of the whole of the health service can be brought into close association. Conditions vary so widely throughout England and Wales that it will not always be possible to make the hospital service conform strictly to this pattern but the general principle should be accepted as a guide to future development. Departures from the pattern should be few and the reasons should be well substantiated. Many of the existing special hospitals have persisted because of inertia but in a few cases there are good reasons for adopting special arrangements.

CONDITIONS REQUIRING SPECIAL CONSIDERATION

Tuberculosis.—Cases of tuberculosis require environmental conditions superior to those likely to be found in all general hospitals for some time to come. The number of patients seeking treatment will probably increase as a result of greater prevalence of the disease, improved methods of diagnosis and recent legislation which provides for payment to patients by the state. The average length of stay of patients in hospital will increase since diagnosis will more often be made at a stage when cure is possible, economic necessity will not force patients to seek remunerative employment as soon as the disability has to some extent been relieved, and better facilities for rehabilitation in hospital will be available. For these reasons the number of patients will be too large to be accommodated in the general hospitals and sanatoria will be required. When as a result of improvements in the health services the incidence of the disease declines it may be possible to treat the patients in departments of the general hospitals, or to establish centres for the treatment of all types of disease of the lungs in the sanatoria.

Children's Diseases.—Hitherto in some cities most of the sick children have been treated in special children's hospitals and there are some arguments for the continuance of this arrangement. The successful treatment of children requires a medical and nursing staff specially interested in the subject. It may be easier to collect such a staff in a special hospital and it may be easier to maintain interest and to carry out intensive training when the attention of the staff is not distracted by other types of work. Nevertheless this type of organisation has certain disadvantages. If children from a wide area are collected in one special hospital many of them will be far from their homes and parents, and visiting becomes difficult. The children left will be so few that it will be impossible to establish good pædiatric departments in the general hospitals. In the general hospitals it has been customary to devote at most one ward to children. This has been done to deal with children who must be admitted for some special reason, such as some domestic difficulty or illness so acute that they are unfit to be transferred, and also to satisfy the requirements of the General Nursing Council. These wards have not led to the development of a satisfactory children's service, and this is particularly unfortunate in the case of hospitals having maternity departments, for one of the most fruitful ways of reducing the present high infantile mortality-rate is the provision of better care for the newborn.

It appears then, taking a broad view, that each general hospital should have a children's section, but that this must be large enough to justify the employment of a specialised medical and nursing staff. It may be found that these sections in the general hospitals are not able to deal with all the children of an area. Some children, particularly those suffering from rheumatic heart disease and various orthopædic conditions, require treatment in hospital for very long periods. They require facilities for education and recreation that it may not be practicable to provide in all general hospitals. It may be necessary to establish hospitals primarily for children of these types and it may be advisable to have sections for the treatment of acute diseases in these hospitals as well.

Mental and Psychological Cases.—Cases of long-term mental disease will require special hospitals. Cases of mental disorder are difficult to classify, but the following classification covers the main types in so far as administrative action is required.

(1) Cases of "neurosis" which are likely to benefit by psychological investigation and treatment.
(2) Border-line cases which may be found to be certifiable but in which psychological investigation and treatment are clearly indicated.
(3) Cases which are clearly certifiable.

In each group two subdivisions should be recognised.

(*a*) Patients in whom the mental disturbance is the sole complaint.
(*b*) Patients in whom the mental disturbance is a manifestation of or is associated with some other pathological condition.

From time to time, in general hospitals, complications such as cardiac mania, puerperal mania or the delirium of pneumonia cause difficulty in nursing. In such cases the mental symptoms usually subside as the underlying cause is relieved and it is unfortunate if the patient must be transferred to another hospital. Staff and accommodation for the care of such patients should be provided in each general hospital, and any legal difficulties in the way should be removed. When properly staffed psychological departments are established in the general hospitals it will probably be found in the interests of the patients suffering from short-term mental disease that they should be treated in special wards in these hospitals. It will be desirable to have close associations between the staffs of the general hospitals and those purely for the care of mental cases.

Infectious Diseases.—If suitable buildings and equipment and an efficient staff are provided there is no longer any difficulty in treating cases of infectious disease in sections of general hospitals. With improved health services the number of cases will no doubt decrease.

Rehabilitation concerns not merely orthopædic cases but patients suffering from any disease or injury. It is the duty of the hospital to restore maximal efficiency in the minimal time to all cases and every hospital should be staffed and equipped with this end in view.

Maternity accommodation should be provided in all general hospitals.

Venereal Diseases may occur alone, may complicate other conditions (including pregnancy) or may be responsible for manifestations which commonly come under the care of the ordinary hospital departments. On the staff there should be a consultant to give advice on the treatment of cases of all types and it will be well to place him at the head of a department dealing with cases of ordinary venereal disease as outpatients or inpatients. There are some arguments in favour of ad hoc clinics and these may be thought to justify the provision of some such clinics in addition to the facilities provided at the general hospitals.

Skin Diseases occur so often in association with general diseases that each general hospital should have a department for the treatment of inpatients and outpatients under the care of a dermatologist.

Cancer.—The requirements of the Cancer Act must be met but it will not be necessary to provide deep X-ray apparatus in every general hospital.

Chronic Sick.—The problem of the chronic sick is likely to increase with an aging population. Classification is often arbitrary but it is possible to divide the cases up in a useful way. Each general hospital should make provision for some of the bedridden and for those likely to benefit from the resources of a general hospital. The nursing in such cases is an important part of nursing training and 10–15% of the total accommodation can be used for cases of this type without exhausting the interest of the staff. Chronic ambulant cases should be accommodated in homes in pleasant surroundings where opportunities for interesting activities are available. If

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it is necessary to retain large institutions purely for chronic cases these should be provided with an adequate medical staff and may with advantage be linked with general hospitals.

Chest Surgery, Plastic Surgery and Neurosurgery are examples of specialties for which centres may be established in one of the hospitals of a group.

Hydrotherapy.—The possibilities of hydrotherapy and dietetic treatment of such conditions as "rheumatism" have not been fully explored by general physicians. The popular faith of members of the upper classes in "cures" may not all be due to suggestion.

Convalescence.—Convalescent hospitals must be considered part of the rehabilitation service which every large hospital authority should provide.

RELATIONSHIP BETWEEN HOSPITALS AND OTHER BRANCHES OF THE SERVICE

It is impossible logically to separate preventive and curative medicine and it is highly undesirable that the two branches should be allowed to develop separately. In the comprehensive health service of the future every person, adult or child, will be entitled to the services of a doctor who will accept responsibility for his medical care, but hitherto people have not sought medical advice soon enough. The doctors have usually left the initiative to the citizen and have not accepted any responsibility for him until he, by seeking their advice, adopts the rôle of patient. Simultaneous education of doctors and public will be necessary if the best use is to be made of the new facilities. The importance of the personal doctor-patient relationship has often been stressed and every effort should be made to strengthen it. No health-service scheme should be considered which does not place on the general practitioner continuous responsibility for the care of a certain number of people. Many of the routine examinations will be more conveniently carried out on clinic lines than by practitioners, visiting individual patients, but any weakening of the practitioner's feeling of responsibility must be avoided. All branches of the personal health services should be brought into close association with the hospitals and the administrators should be given the advantage of close contact with clinicians and patients.

General Practitioners.—The hospitals in many areas have already developed useful contacts with the general practitioners, most of whom have now confidence in the municipal hospital service. If a system of health centres is established these contacts will naturally be developed and extended. If the hospitals are correctly placed in relation to population each will be surrounded by a group of health centres, working in close association. All the facilities of the hospital, such as X rays, laboratory and consultant services, must be readily available for the doctors attached to the centres. The practitioners should be represented on the medical staff committee of the hospital.

Tuberculosis.—There should be a comprehensive scheme whereby those physicians specialising in tuberculosis work should see all sides of the problem; they should have charge of beds and also take a share in prevention, diagnosis and after-treatment. At each sanatorium the medical staff should treat the inpatients, examine the contacts, conduct diagnostic clinics for patients referred to them, supervise patients discharged from the sanatorium, and, if uecessary, in association with the general practitioner, visit these patients in their own homes. The staff of each general hospital should include a physician from the nearest sanatorium. He should conduct a clinic at the hospital, advise on all difficult cases and supervise the treatment of any cases of tuberculosis (e.g., pregnant women) being treated in the hospital.

Maternity and Child-welfare.—Each general hospital will have a maternity department and the clinics of the neighbourhood will be conducted by the staff of the hospital. Since in a comprehensive health service everyone will have a general practitioner it is likely that the pregnant woman will first report to her own doctor. He will usually refer her to one of the hospital clinics. General practitioners who wish to do midwifery will be encouraged to take some part in the midwifery service of the hospital. If a patient wishes to be confined at home every facility of the hospital will be available for her own doctor. The municipal midwives should be on the staff of the hospital of the area in which they work; they would then be available for intern or domestic work according to the demand. Health visitors should be absorbed into the comprehensive scheme and should be used to fill out the gaps in the existing almoner service of the hospitals.

The hospital would be the centre of a pædiatric service which would accept responsibility for the infant from the moment of birth. In the past too little attention has been paid to neonatal disease and its prevention; little has been done to guide the mother through the difficulties of breast-feeding. Some advice may have been given at antenatal clinics but the special problems of the individual are not then apparent. The pædiatric staff would conduct clinics, open to all the children of the area. Health-centre practitioners would be encouraged to take part in these clinics and if interested in the subject they would be appointed to the staff. The records of the examination of the children would be entered on the routine examination card and in addition on the child's personal card so that the information would be available for the child's practitioner at any time. Many of the most useful preventive health measurements must be taken in children in the preschool years, and routine examinations of all these children would be made. The service of the clinics would include immunisation. Sick children would be admitted to the pædiatric wards of the hospital, where there would be accommodation for lactating mothers.

School Medical Department.—School medical officers deal with the routine examination of school-children whom they have not previously seen. The work is not very interesting and the artificial separation of diagnosis from treatment (except in the case of a few minor ailments) is liable to produce a sense of frustration in doctors who have no other duties. Routine school examinations should be done by the health-centre practitioners. A school or schools should be allocated to each centre. The children would be brought to the centre class by class, preferably in the afternoons. The form of examination would be prescribed centrally. The practitioners working in the groups would conduct the examinations. This would allow the advantages of division of labour and provide a second opinion in case of any difficulty. It would bring interest to work which otherwise tends to become monotonous. When abnormal conditions were found the child would be referred to his own practitioner or to the appropriate department of the hospital. Parents would be encouraged to attend with their children. There would be no objection to the supervision of the work by existing school medical officers or by pædiatricians to direct the work on right lines, but the necessity for this would disappear sooner in the case of school-children than in the case of infants. The medical care of children in special schools would be undertaken by the pædiatric staff of the hospital.

Central Administration.—The scheme suggested aims at providing a complete clinical personal health service with continuity of clinical interest and responsibility. The central offices of the medical officer of health would give general direction to the service and coördinate the parts with the various other public health activities.

DEFECTS IN EXISTING HOSPITAL SERVICES

The hospital services have improved very much in recent years, especially since the passing of the Local Government Act of 1929, but many defects remain. The rate of progress has been limited by financial difficulties. Cities with large numbers of unemployed could not devote sufficient money to hospital improvement. The financial difficulties have been accentuated by the fact that a low value has been placed on the hospital services in making agreements with contributory schemes or other users of the hospitals. The main defects of the hospitals are as follows.

Unsuitable Geographical Distribution.—Hospitals should be so situated that they are within easy access of the users and should be well served with transport facilities.

Inadequacy of Staff.—The shortage has been not merely in the medical and nursing staff but in clerks,

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typists and technicians in all the ancillary departments. Work of greater volume and better quality may be obtained from the higher grades by multiplying the lower-grade workers. Much better facilities for recording and classifying the information laboriously gained by the clinicians should be provided if the best possible results are to be obtained.

Food.—Apparently the financial controllers of hospitals have never quite appreciated the importance of food in the lives of patients and staff. There should be a much higher standard of staffing in hospital kitchens, and the equipment for storing, cooking and distributing food should be on a scale that most people now would consider extravagant.

Structure and Equipment.—Throughout the country many hospitals and parts of hospitals are being used for purposes for which they were not designed. The continued use of such buildings, by placing unnecessary burdens on the staff, may be very poor economy. The most expensive single factor in hospital costs is staff and the best material and mechanical aids should be available to reduce unnecessary labour.

New hospitals should be planned on the bold lines with which the war has made us familiar. The theory that a hospital should be designed to last only 15–20 years does not seem reasonable, but the site should be of sufficient size, and the probability of finding it necessary to enlarge special departments from time to time must be kept in mind. The planning should not be hurried and every detail should be worked out in relation to function. There is a good deal of general agreement on hospital design, although there are differences of opinion about the best type of building. Most hospital administrators are sensible of the existing defects in detail and could advise an architect about what should be avoided in the future.

Limitation of the Hospital Services.—Many of these are due to shortage of staff. The day to day work tends to be conducted, of necessity, in an atmosphere of hurry. This is perhaps not so much that the physical examinations are carried out at undue speed as that sufficient time is not spent in getting to know the patient and in assessing his contribution to the diagnosis and treatment. The contacts made by the medical staff with the patients and their relatives are not sufficiently close. Inadequate time is available for explaining the patient's illness to himself and his relatives. This duty of the hospital staff is time-consuming but it is so important that it should not be neglected. Records are not always sufficiently detailed, and record-filing and especially cross-indexing are incomplete. There should be a final summing up when, by consultation between all those who have contributed anything to the facts gained, a complete picture is formed and the case is placed in its proper niche. At present there is seldom time for this.

The special departments give an inadequate service. The dental service, if complete, would ensure that no patient was discharged from the hospital with diseased teeth or without dentures if these are needed. The ophthalmic service deals only with the more obvious defects; imbalance is seldom searched for and squint clinics are almost unknown. The ear, nose and throat department does not give the service needed by the public, as is shown by the frequency of death from intracranial complications of otitis media. In general, the outpatient departments are organised for the age of scarcity.

Study leave is rarely granted to members of the staff, and little encouragement is given for the performance of social duties such as acting as examiners. Better libraries should be provided for the medical and nursing staffs.

Research is a magic word often used for conjuring things that have little to do with the improvement of the health services, but properly organised research might in a comparatively short time have a highly beneficial effect. A mass of facts is accumulating in the municipal hospitals and it is not being digested. Accurate figures are essential for valid conclusions but at present the more accurate figures of the municipal hospitals are diluted by inaccurate figures from other sources and useless conclusions are reached.

TEACHING IN MUNICIPAL HOSPITALS

It will probably be wise to concentrate the early stages of teaching in a small number of hospitals. At the stage when students are being taught the elements of medical and surgical practice it is important that they should work under the close supervision of clinical tutors and their chiefs. It would be wasteful to produce this teaching machinery in every municipal hospital.

In a student's later years, when he has acquired theoretical knowledge in pathology and has been instructed in methods of examination, he will be able to profit by the experience available in a municipal hospital. It will be a great advantage if places for resident students are provided.

The present tendency for the teaching of medicine to develop on whole-time professorial lines will probably facilitate coöperation with the staffs of the municipal hospitals. The existing system of medical education has produced an ample supply of consultants and specialists for university centres and teaching hospitals, but not for less fortunate parts of the country. Much of the work of making good the deficiency will fall on the municipal hospitals. Young doctors will be expected to spend some years in hospital before commencing general practice and practitioners will take revision courses more frequently than is now usual. The general standard of postgraduate teaching will rise and in the whole of this field the municipal hospitals must be prepared to play an important part.

ADMINISTRATION

Members of the senior medical staff should have the opportunity of expressing their individual or combined opinions on the affairs of the hospital. This opportunity can most easily be provided by setting up in each hospital a medical staff committee. This should include:

All members of the consultant staff (whole-time or part-time).
All members of the medical staff above the rank implied by the term "registrar."
The medical superintendent and his deputy.
Representatives of the health-centre practitioners.

The committee should be free to discuss any matters which appear to affect the well-being of the patients. It would meet regularly and any recommendations made would be submitted to the committee of management as an item on the agenda in the report of the medical superintendent. To make it a rule that the medical superintendent should be chairman or secretary would limit the freedom of the committee to an undesirable extent. He should be a voting member eligible for election as chairman or secretary. This would probably ensure that the clinical and administrative aspects of the hospital were not considered apart from each other. The chairman and secretary should be elected annually. The medical and lay administration should work in close association and the status of the lay administrators of hospitals should be raised.

When an administrative area contains a number of hospitals and health centres some form of central medical committee will be required. It has been suggested that there should be two central committees, one representing the health-centre practitioners and the other the hospitals staffs. The medical officer of health by meeting both committees would become aware of the views of both. This would meet the fear of practitioners that in any combined committee their views might not receive adequate consideration, but it is open to the serious objection that it would tend to separate the general practitioner services from the hospital services. It would probably be better to have one central committee made up of three representatives elected annually from each hospital medical staff committee, one of these representatives to be a consultant, one a general practitioner and the third to be of either group: the medical superintendent and his deputy to be ex-officio members.

Much criticism has recently been levelled at the municipal system of administration on the grounds that it is too authoritarian and gives the medical superintendent power which he uses to thwart the initiative and independence of other members of the staff. Some of the critics fail to appreciate the wide social responsibilities of the municipal service. Each municipal

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hospital is part of a service which must provide care for the sick of the area. It cannot like a voluntary hospital make an arbitrary selection from the cases presented. The relatively static type of organisation found in the voluntary hospitals is not adequate for the different conditions. The municipal hospitals require a more flexible type of machinery allowing rapid adjustments to be made to meet changing needs.

It is the duty of the medical superintendent to see that every patient in the hospital receives proper care and treatment, so he must often make arrangements which involve some interference with other members of the staff. Difficulties are increased by the fact that up to the present municipal hospitals have not in every case been provided with a complete staff of senior consultants, undertaking continuous responsibility for beds or wards in the hospital. There are sometimes gaps in the service which the medical superintendent must make good with the resources at his disposal. The medical officer of health, who has responsibility for the whole service, may similarly have to make adjustments which interfere with individual hospitals.

It is difficult to define the duties of clinicians and administrators when conditions vary widely and respective fields overlap. Harmonious working requires good will and give and take on both sides. It should be recognised that power and responsibility are complementary and duties should not be allocated without the necessary authority for the performance of the particular task being given. The relationship between the clinical and administrative staffs should be close; it is only if the members treat each other as colleagues that each group will make its proper contribution to the work of the hospital. A system of staffing should be developed according to which consultants, whole-time (or in exceptional case part-time), with whole-time senior and junior assistants, are arranged in firms and undertake continuous clinical responsibility for sections of the hospital work. Each firm should have freedom of clinical action and in general matters freedom limited merely by the needs of the service as a whole. This freedom would involve duty and responsibility as well as privilege. Highly authoritarian directors of clinics would be no improvement on dictatorial medical superintendents. Firms should not be rigidly segregated. Redistribution of beds may be necessary from time to time to meet the obligations of the hospital, and this reallocation would be the duty of the medical superintendent.

It is desirable for a medical superintendent to do some clinical work. Clinical contact with patients preserves his feelings as a doctor and accordingly facilitates his dealing with the other members of the staff and increases his usefulness as the integrator of the clinical and administrative sides of the hospital work. The duties of the medical superintendent are in the nature of things comprehensive. He must accept responsibility for seeing that the proper arrangements are made for the care of every patient with whom the hospital makes contact. It might appear that in carrying out this difficult task there would be danger of interference with the reasonable freedom of the clinical staff. Any such tendency should be corrected by the introduction of medical staff committees constituted in the manner suggested. As the staffs of the hospitals are increased and the clinical field becomes more completely covered the occasions in which it is necessary for the medical superintendent to interfere become fewer.

A very difficult part of the medical superintendent's duties will be that which results from his wide responsibilities to the management committee and the medical officer of health. The MOH should meet the medical superintendents not less often than once a month. Such regular meetings would go far to integrate the service and reduce the risk of misunderstandings between various individuals and sections of the staff. If a democratic system is to operate in the hospitals, medical superintendents must be well-informed on general policy.

* * *

The scheme described could be applied almost at once to some of the county boroughs, but for general application to the country as a whole alterations of local government boundaries would be necessary.

Special Articles

CANADA

THE fourteenth annual convocation of the Royal College of Physicians and Surgeons of Canada was held on Sept. 30 in Ottawa. Honorary fellowship was given Major-General W. H. Ogilvie, consulting surgeon to the British Middle East Command, who received the diploma in person. The award was more than a recognition of service with the forces; General Ogilvie has addressed the Academy of Medicine of Toronto and other medical societies throughout Canada and his clinic in London has been a Mecca for many young Canadian surgeons studying in Britain before the war. Two noted Russians were also admitted to the honorary fellowship: Lieut.-General Y. I. Smirnov and Professor Bagdasarov. Sir Eugene Fiset, Lieut.-Governor of Quebec, who had been DMS in the Canadian army for twenty years before he retired, was also awarded the honorary fellowship. A number of senior surgeons who hold the FRCS or FRCSE were granted fellowships ad eundem gradum. Candidates qualified by examination were also admitted as fellows of the college.

SOME SAVINGS

Canada's fifth war loan has just been raised. The amount asked for was one billion two hundred million dollars. British readers must draw no rash conclusions about the wealth of Canada since this sum only represents about three hundred million pounds. A billion in France and North America means a thousand million and not the astronomical figure of a million millions as in Great Britain. A month before this loan was called for, the collections for local welfare work were made in the leading cities across Canada. The objective was $5,076,412 and in a week $4,994,185 was collected.

CCF AND THE FUTURE OF MEDICINE

About a dozen years ago a new political party came into being. "Coöperative Commonwealth Federation" was the name chosen and, in the recent election of the Ontario legislature, it showed surprising strength although it failed to elect a member in Prince Edward Island. The Roman Catholic bishops have announced that the church has no objection to its members voting CCF if they so desire. This is interesting to medical readers because the leader of this party in Ontario is making speeches in which he demands complete socialisation of medicine. He asks for forty thousand practitioners in Canada, or about four times the present number. He advocates freer admission to schools of medicine and the creation of new schools, so that this objective may be quickly reached. The Canadian Medical Association and its divisions in the provinces are strenuously opposing the idea, but senior medical officers in the army overseas are finding regular salaries and regulated hours of work attractive. A panel of four hundred, however, would not pay more than a school teacher's salary, regular though it might be; a captain's pay is much more likely to be the general rule than that of a colonel.

TORONTO'S HOSPITALS

The second war-time conference of the Ontario Hospital Association occupied three days of October in Toronto. Excluding sanatoria for tuberculosis and hospitals for mental diseases there are 8 for incurables, 3 for convalescents and 145 general hospitals in Ontario, 28 of which are Red Cross units, 28 under Roman Catholic sisterhoods, 3 are conducted by the Salvation Army, 2 by the United Church of Canada and 1 by a Church of England sisterhood. The others are managed by appointed boards, or in several instances are owned and operated by a municipality. The financing of these institutions is generally difficult. They are served by voluntary staffs and most of them have training schools for nurses. A fixed daily amount is paid by the government for indigent patients and a larger amount by the municipality, but these payments do not cover the cost. To offset the deficits higher rates are charged in special wards or private rooms and these rates are collected from the patients who are cared for by the physician of their choice and are liable for professional fees. The result is that a large hospital is "Hôtel Dieu" to the majority

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of its tenants but "Hôtel de Luxe" to the minority. The new Minister of Health of Ontario in his address to the association promised a revision of the per-diem allowances.

A RESEARCH INSTITUTE

McGill University, in association with the Royal Victoria Hospital, Montreal, has set up a department of psychiatry and an institute for research and teaching. Through the generosity of Sir Montagu and Lady Allan a building and an extensive site have been provided. The institute will contain fifty beds and laboratories. The project is supported by the Rockefeller Foundation and the Government of the Province of Quebec.

The first holder of the chair and director of the institute is to be Dr. Donald Ewen Cameron.

MEDICINE AND THE LAW

Fracture or Disease?

FAILURE to recognise a fracture or to advise X-ray examination may well be a ground for an award of damages against a practitioner. A recent case at Leeds assizes (Wheeler *v.* Stevenson) shows, however, that the evidence of a radiogram is not always easily or automatically conclusive. Mrs. Wheeler, aged 27, met with a motoring accident early in 1937. Having received emergency treatment in hospital for injuries to the head and bruising of the right hip, she came under the care of her panel doctor, Dr. F. J. Stevenson, who attended her for some three weeks. According to her evidence in support of her claim at Leeds, she complained to him of pain in the hip, and after examining her he told her she could get up. She found her leg stiff and her hip continuing still so painful that, before returning to work, she again saw Dr. Stevenson about it. He, she said; told her it was rheumatism. She remained at work till she married in the following year; she did not again consult a doctor till 1942. It was then discovered by X-ray examination that she had an old fracture of the neck of the femur, impaction of the head of the bone and comminution of the head, and also apparently a fracture of the roof of the acetabulum.

The defendant practitioner, whose case was conducted by the London and Counties Medical Protection Society, said that Mrs. Wheeler had never suffered a fracture but that her condition was due to Perthes's disease. Valuable expert evidence was given on Dr. Stevenson's behalf by Sir Charles Gordon-Watson, Dr. H. K. Graham Hodgson, and Brigadier W. Rowley Bristow. Brigadier Bristow considered the X-ray photographs showed long-standing abnormality in the hip-joint, occurring during growth. This opinion was confirmed by the other two witnesses. Mr. Justice Oliver observed that the plaintiff had to prove not only the defendant's negligence but also that she had thereby suffered damage. If she had satisfied him on the first point, she had not proved the second. He declared himself convinced by the evidence that the plaintiff suffered from some congenital disease and was no worse today than she would have been if Dr. Stevenson had not attended her. Both a fracture and the disease would have brought about the osteo-arthritis from which she now suffered. If there was a fracture, there was no displacement. No surgical treatment could have been carried out. Without deciding one way or the other the issue of the alleged negligence, said the learned judge, he was satisfied that, if there had been a fracture and if it had been treated, the patient would have been no better off. He thought, in fact, she might have been worse off. He therefore gave judgment, with costs, for Dr. Stevenson.

Practitioner charged with Rape

Dr. K. M. Pardhy was acquitted at the Birmingham assizes on Dec. 16 on the charge of committing rape upon a patient. When, after police-court proceedings lasting three days, he was tried at the Birmingham summer assizes before a jury of five men and three women, the jury failed to agree and the judge ordered a new trial.

The allegations were remarkable. The prosecution alleged that, under the guise of a medical examination of a married woman, the accused committed the offence in his consulting-room without the patient being aware of it at the time and while her husband was sitting behind a screen a few feet away in the same room. When, it was said, she became aware of the offence, she called out to her husband; he came out from behind the screen, and, as the result of what he saw, caught hold of the doctor's wrists and called him a swine. The prosecution conceded that, both then and at all other times, the doctor denied the charge. Evidence was given for the Crown by the married woman, her husband, police officers and Prof. J. M. Webster. Professor Webster, who had examined the patient the same night, was, during his own re-examination in the witness-box, invited to join in reconstructing the position in which the patient would have been placed in the consulting-room. Defending counsel successfully objected to the reconstruction. He had also objected successfully to a proposal by the prosecution to call a fresh witness, a gynæcologist, who had not given evidence at the previous trial. It was said on behalf of the Crown that it was very difficult to secure the reappearance of the gynæcologist who had given evidence last summer. The defence protested that only three days' notice had been given of this fresh evidence although the previous hearing had been held five months ago. The judge said it was a question not of law but of fair play; the accused must not be prejudiced; the evidence was excluded. Judge and jury paid a visit to the consulting-room.

Dr. Pardhy, who is 69 years of age and has practised in Birmingham for 35 years, gave evidence and repeated his denials. The defence urged that the commission of the offence was impossible and the suggestion that it could be committed without the patient's knowledge was ridiculous. After three days' trial the protracted ordeal of the accused has finally ended in his acquittal.

WHAT THE DOCTOR EARNS

AN AMERICAN INQUIRY

DOCTORS' earnings in Britain are something of a mystery. A study of the advertisement columns of the medical journals will, it is true, enable the statistician to build up a picture of the range of salaries and their mean; but most doctors are still conducting their work on a business basis. In the PEP report of 1937 [1] it was estimated that the average gross income of all doctors in the Medical Directory was about £1200 a year, but no figures for expenses are given.

Meanwhile, Denison and Slater [2] have carried out a survey of medical earnings in the United States. Questionnaires were sent to a representative sample of doctors, asking them to give information about gross and net income, costs of practice, employees and their pay-rolls, the doctor's age, and other items, between 1936 and 1941. Questionnaires were not required to be signed, and were not identifiable in any way. Doctors on whole-time salaries and those working in institutions were excluded from the sample. In spite of this, 82 returns were received from "all-salaried" doctors. In all, 1898 returns were received, of which 1586 were from entirely "non-salaried" doctors, and 230 from doctors working partly in private practice and partly on a salaried basis. Unfortunately we have to take the authors' word for the representativeness of the sample, as we have no data about the number of questionnaires sent out. However, the returns were weighted by region, age, and degree of specialisation; the process of weighting lowered the average income by $83, so it appears that the more prosperous doctors were the more ready to make returns.

Granted the validity of the data, the results could hardly have been better expressed. Average and median net incomes are given, as well as percentage distribution analysed by income groups. (The median is the level above and below which occur an equal number of cases). The main results may be summarised thus:—

	All doctors	*Non-salaried*	*Part-salaried*	*All-salaried*
Number reporting	1898	1586	230	82
Average net income	$5179	$5047	$5974	$5495
Median net income	$3912	$3756	$4538	$4300

The percentage distribution by net income classes shows that, with divisions at every $500 level, each group between $500 and $8000 contains, with one exception, over 5%. This means that only about 25% of doctors earn figures outside this range. Comparative

1. The British Health Services. PEP. 1937.
2. Denison, E. F. and Slater, A. *Survey of Current Business.* October, 1943, p. 16.

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studies show that doctors' average and median net earning are above those of dentists, vets, and lawyers. Among the doctors, the highest average is for the part-salaried, and the lowest among the non-salaried; distribution by income classes shows that none of the all-salaried doctors came into the highest or lowest categories—above $30,000 or below $500.

What does this mean translated into British money? In making such a calculation, it must be remembered that the cost of living is considerably higher in the United States than in Britain. On a basis of $4 to £1, the average income of all doctors is £1295, and the median £978. Few doctors earn less than £125, and roughly 20% earn more than £2000. About 70% earn between £125 and £2000, with 30% between £475 and £875. Nearly 40% of the all-salaried doctors earn between £750 and £1250.

A similar study in this country seems to be urgently required, in view of impending decisions on a national health service. But it is doubtful whether a questionnaire inquiry would yield unequivocal results. A research by the Inland Revenue Department on income-tax returns would not be open to this objection. There is one great danger in such an inquiry. It is useless to give averages and medians only. What is wanted is a curve showing the distribution of medical incomes. Only then will it be possible to compare the opportunities which a salaried service would offer with those enjoyed by the private practitioner at present.

In England Now

A Running Commentary by Peripatetic Correspondents

AFTER two or three years in the Services, it is a good thing to pause and take stock to see how the life has affected your mental outlook. This is simply done by means of the following test. You are classified according to the section in which the majority of your answers appear. The key is appended.

1. When a man complains of "terrible headache for the last fifteen years," do you
   (A) run him in for malingering,
   (B) prescribe tinc. asafœtida in hourly doses,
   (C) refer him to a psychiatrist?
2. If your quarterly returns won't balance, do you
   (A) fudge them,
   (B) probably never notice,
   (C) blame the system?
3. On receiving the *Lancet*, do you turn first to
   (A) the advertisements,
   (B) peripatetic correspondents,
   (C) the latest paper on biochemistry of moulds?
4. In slack periods during working hours, do you
   (A) inspect sanitary arrangements,
   (B) play Monopoly with your staff,
   (C) read Price's *Medicine*?
5. A friend mentions the Rh factor. Is he talking about
   (A) victualling,
   (B) gunnery,
   (C) blood?
6. (Naval types only.) Has the cheap price of gin given you
   (A) an aim in life,
   (B) a gastric ulcer,
   (C) a pride in the excise laws?
7. When reprimanded by a senior medical officer on a point of routine, do you
   (A) look it up and make a note of it,
   (B) say "yes Sir, no Sir, three bags full Sir" and take no notice,
   (C) burst into tears?
8. Do your messmates say about you
   (A) "good chap at a party; wonderful collection of stories and fair knocks back the whisky,"
   (B) "he cured malingering in a week by holding Sick Parade at 0730,"
   (C) "a bit cranky, but harmless if humoured"?
9. The Commanding Officer asks to see a confidential medical document. Do you
   (A) pretend you've lost it,
   (B) tell him to mind his own business,
   (C) give it to him, and write to your Protection Society?
10. A man says he thinks he has V.D. What do you do first,
    (A) collect lurid details of his sex-life,
    (B) think, "there, but for the grace . . .,"
    (C) read him a moral riot act?
11. On commencing your morning visit, do you immediately put your hand
    (A) along the top of the door to pick up the dust,
    (B) on the kettle to see how long tea is likely to be,
    (C) on the patient's wrist?
12. When inspecting a large draft of men for bodily cleanliness, are you struck by
    (A) the number of crabs,
    (B) the extraordinary inconstancy of the physique: phallus ratio,
    (C) the commonness of endocrine disorders?

KEY—(Anything in between you work out for yourself.)

Predominant A.—You are nicely suited to Service life and would do well to consider it as a peace-time career. They would be glad to keep you, as you fit in well socially and give little trouble professionally. You find the job congenial and free from awkward problems of conscience. If this does not appeal to you, try and mould yourself a little on B.

Predominant B.—You appear to be adapting yourself well without becoming too bound up with routine and tradition. But there is a danger of falling between two stools. You will be demobilised early, for you do not fit in well with the Service hierarchy (they do not like your superciliousness towards the Service mind). But beware, lest you also forget the peace-time practice trappings; you will not find it easy to go back and learn all over again.

Predominant C.—You are a professional idealist, too academic, and quite out of touch with the reality around you. I suspect that your sick parades are incomprehensibly (to you) long. If you cannot be a bit more brutal to your conscience and patients, I can only suggest that you try for your ticket before you become completely psychotic. I recommend persistent disabling headaches. Nobody can prove they don't exist, and lumbar punctures can't last for ever.

* * *

Before the war I read Rhine's *Extra-sensory Perception*. This book demonstrates mathematically that in certain students at Duke University there were rudimentary, single-factor, but definite telepathic and clairvoyant abilities. In his tests Rhine separated the two, but as they varied approximately in the same degree in illness, with visitors and other distractions, and under the influence of sodium amytal and caffeine, he came to the conclusion that the same mechanism is at work. Since the war I have been watching for any evidence of these useful gifts in the field. In spite of only too many opportunities—the missings, prisoners of war, castaways, sudden deaths and emergencies from deadly peril—I have not come across a vestige of evidence for telepathy or clairvoyance, though it would have been most useful in many cases. Yet in a way this is what one might have expected from Rhine's experiments—any emotional disturbance and the scoring fell towards chance guessing. Indeed there seems a trivial or homely or perhaps pastoral quality about this gift; it's like a parlour trick or a shepherd boy's fluting. It is as though one can telephone small talk, but not for the doctor or fire brigade; most exasperating, but I suppose one may be feeling annoyance at five-finger exercises. Julian Huxley in that splendid synthesis *Evolution*, mentioning Rhine's work, tentatively suggests that man's further evolution may depend on developing these gifts—and the Christmas "Brains Trust" was with him. But it is hard to see that they have any survival value at present. Of course, we don't know what the sponsoring gene or gene-complex does as well, though there is some evidence that it makes for artistry.

The good old horse Æsculapius generally shies at anything new, and this strangely painted door may be an elaborate hoax perpetrated by a number of respectable Americans and people like Wm. McDougall, who wrote the foreword to the book. On the other hand it may open into an enchanted garden, an interglacial period swamp—it may be a lost form of communication (my bet), or an ordinary rubbish cupboard.

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Peripatetic duties are much less exhausting than they were two to three years ago—if one has the petrol to be peripatetic at all. Signposts have sprung up again like mushrooms, and failing them one can at least ask the way without inviting a suspicious stare and an evasive or patiently misleading answer. Lost last week in some of the meaner streets of Birmingham I picked on the passer-by who looked least likely to plead that he was a stranger about there. Could he tell me the road to Warwick, I asked. "The road to Warwick," he repeated ruminatively. And then brightly, "Where were you thinking of going," he said. I explained I *had* thought of Warwick. He chewed the mental cud for a bit and I could see that this reply had struck him as eminently reasonable. But there were difficulties which I had not properly appreciated. "You should not start from here," he said severely. I did not really want to, I pleaded, but I had not been able to think of a way out of the dilemma. He thought over this for so long that I prepared to go and start from somewhere more fitting but he stayed me with a majestic sign. And then with a wealth of gesticulation and mimicry the floodgates burst. I went straight up there (and his pointing finger pierced my heart), under the railway bridge (he bowed his head low to avoid its arch), past the traffic lights (we paused an appropriate time for the "red"), under the second bridge (we both bowed low and reverently), round the roundabouts (so many times according to his whirling fingers that I knew I must be sick), turn sharp to the left. . . . Weakly I pleaded that I knew the way when I got there. But I had asked for information and have it I must. Spellbound I listened and watched twice through. I escaped at last and put sceptically to the test the inevitable parting assertion, "You can't miss it." Oddly enough I couldn't.

* * *

An American expert questioned on the nomenclature of influenza in the United States: "Well at home it's like this. If the hired help gets it, it's malingering. If the children get it, it's a cold. If the wife gets it, it's the grippe. But if the Lord of the Manor gets it, it's INFLUENZA."

Parliament

FROM THE PRESS GALLERY

Medical Examination of Recruits

ON the motion for adjournment in the House of Commons on Dec. 16 Mr. J. H. MARTIN raised the question of insufficient medical examination of Service recruits. He had found in the last year or so that the number of men discharged from the Army for physical or mental reasons after having served from six months to two years was growing. Pensions were being given to people who ought never to have been placed in the position of having their health affected by military service. Something should be done now that the Service authorities were tapping the older age-groups. A keen watch should be kept on these men and where they were found unfitted for military life they should be returned to civil life before their health was seriously affected.

In reply Mr. ARTHUR HENDERSON, financial secretary to the War Office, said the practice of the medical boards set up by the Minister of Labour and National Service under the National Service Acts was governed by a code of instructions issued in May, 1939, which had been revised from time to time by a committee under the chairmanship of Lord Horder. That committee advised the Minister of Labour on all questions in connexion with the medical examination of men for the Forces, and representatives of the three Services sat on it. Every recruit was seen by four doctors. Most of the examiners were general practitioners, many were retired officers, and a few of the chairmen were consultants. The first examiner investigated the man's mental condition, nervous stability, previous health, and nervous system; the second his teeth, throat, nose and ears, physical development, movement of joints, history of injuries and operations; the third his pulse-rate, heart, chest, lungs and abdomen, and confirmed abnormalities noted by the other examiners. The chairman reviewed the case as a whole and decided the grading. The average examination took just under half an hour. Any man about whom the board had doubt might be referred to a consultant. Since June, 1939, about 5% of the men examined had been referred to an ophthalmologist and 5% to other specialists.

Recruits were classified in one of five grades, 1, 2A, 2, 3 and 4. Only men placed in grades 1, 2A and 2 were accepted for service. The civilian medical board grades were translated into the Army categories A, Ai, B, Bi and reviewed by a military medical officer when the man joined up. The Army MO did not undertake an exhaustive examination, though he did examine the man stripped, but he checked the facts ascertained by the civilian board. It was sufficient for this examination to take place when the man arrived at his unit and the facts contained in the civilian board's report were at the disposal of the military MO. Unless there seemed to be an error in grading no category was changed by an Army MO, except for technicians, till the man had been at least one month in the Army. The interval between a man's medical examination under the National Service Acts and the date when he joined his unit did not normally exceed 6–8 weeks. Regulations were about to be issued which would ensure that no man should be called up for service who had not been examined or re-examined within the preceding 6 months.

A man who considered that he had been wrongly graded could protest and his protest would be considered by the Ministry of National Service. If there was reason to think his health had deteriorated, or if fresh medical evidence could be produced, a re-examination was arranged. Since September, 1941, a note had been placed on the grade card given to a man at his medical examination asking him to notify the Ministry of National Service if before he was called he had a serious illness or accident, or had reason to believe his health had deteriorated. In the opinion of the Army medical authorities the number of men invalided within 6 months as a result of an error in grading from July 1, 1941, to Aug. 31, 1943, represented 7 in every 10,000 of the total intake during that period, and 3 in every 1000 of the total invalided during the same period. The figures for the period before July 1, 1941, were not available.

QUESTION TIME

Committee on Juvenile Delinquency

Dr. RUSSELL THOMAS asked the Home Secretary if he would consider setting up a committee to investigate the problem of juvenile delinquency in all its aspects.—Mr. H. MORRISON replied: The suggestion has been well in my mind in connexion with postwar developments, and I shall hope before long to appoint a committee to advise me on some or all of the aspects of this subject. Ten years' experience of the working of the Children and Young Persons Act 1933 has satisfied my advisers that, generally speaking, the principles upon which young offenders are at present being dealt with are sound and the progress has continued despite the unfortunate impact of the war on social conditions. I should like also to express my appreciation of the admirable and successful work, of which the general public knows so little, done by justices sitting in juvenile courts, by probation officers, and by heads and staff of approved schools and other homes or institutions for children which assist the juvenile courts in their work.

Psychological Examination of Mining Conscripts

Mr. D. L. LIPSON asked the Minister of Labour if he would arrange that the medical examination of youths liable to be conscripted for coal-mining should include examination by a psychologist, who would decide whether they were temperamentally suited or not for work of this kind before their names were subjected to the ballot.—Mr. E. BEVIN replied: It would not be practicable to submit all men who are examined under the National Service Acts to a special psychological examination directed to temperamental fitness for coal-mining. Men selected for direction to coal-mining will be given a further medical examination if they so request. —Mr. LIPSON: In view of the trouble that has been caused in the mines in the past by compelling those who were unsuited to the work to undertake it, does the Minister not think it would be just as well to be wise in time and take such steps as I have indicated, as there is otherwise the danger of trouble from the other miners?—Mr. BEVIN: I have never yet accepted psychologists as people with supreme wisdom.—Mr. LIPSON:

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Very short-sighted.—Mr. G. GRIFFITHS: No. It is the hon. member who is short-sighted. (Laughter.)

Scottish Scientific Advisory Committee

In answer to a question the Secretary of State for Scotland said that the present members of his scientific advisory committee are:

Sir John Orr, MD, FRS (chairman), Prof. Carl Browning, MD, FRS, Prof. F. A. E. Crew, MD, Prof. I. de Burgh Daly, MD, FRS, Sir John Fraser, FRCSE, Prof. D. Murray Lyon, MD, Sir Alexander Macgregor, MD, Prof. T. J. Mackie, MD, Sir Edward Mellanby, MD, FRS, and Prof. W. J. Tulloch, MD.

Queen Charlotte's Hospital Nurses Home

Replying to questions the MINISTER OF HEALTH said: At the outbreak of war the nurses' home at Queen Charlotte's Hospital was still a shell and building work was discontinued. In September, 1941, the shell was requisitioned for the storage of furniture from bombed houses, with the consent of the hospital. Pressure on the hospital's beds increased, and after discussion it was agreed that an effort should be made to carry on the building of the nurses' home in spite of war-time difficulties in order to free the beds in the hospital now occupied by nurses. Agreement was reached in regard to the disposal of the furniture and it was decided in August last that plans should be got out for the completion of the major part of the home. These plans, which will involve the use of large amounts of controlled materials, were submitted to my department only on Nov. 29, and are now being considered.

Stability of Repatriated Prisoners

Brigadier-General Sir ERNEST MAKINS asked the Secretary of State for War whether he was aware that advices from German camps where prisoners of war were confined showed that in many cases there were signs of mental strain; and whether, in the selection of prisoners for repatriation, sympathetic consideration had been given to those men who suffered from obvious mental derangement due to confinement and to the difficult conditions under which they existed.—Sir JAMES GRIGG replied: The selection of prisoners of war for repatriation is carried out according to the Geneva Convention by a mixed medical commission of two neutral doctors and one German doctor. Mental and nervous affections are specified in the convention as diseases which justify repatriation. Thirty-two British prisoners were recently included on these grounds among those repatriated from Germany. The number of prisoners of war in Germany classified as suffering from mental ailments is small. Mental hospitals in Germany are frequently visited by the protecting power and the prisoner of war inmates also occasionally receive visits from British chaplains. They are supplied with books and Red Cross parcels.

Pneumoconiosis Disablement Certificates

Mr. NESS EDWARDS asked the Home Secretary if he proposed to take any special steps to deal with the large number of applications for certificates of disablement by reason of pneumoconiosis which were outstanding in South Wales, and if he would state the number of applications for certificates of disablement by reason of pneumoconiosis which had been made to the South Wales medical board; and how many were awaiting decisions.—Mr. MORRISON replied: Since July 1 last the medical board have received 2213 applications from South Wales coalminers under the Various Industries (Silicosis) Scheme, 1931, or the Coalmining Industry (Pneumoconiosis) Scheme, 1943. In 1282 of these cases the board have not yet come to a decision. As from July 1 last the strength of the medical board in South Wales was doubled and further assistance is being given so far as is practicable. I fully recognise the desirability of doing everything possible to cope with the increased work, but the claims on the medical profession at present make it difficult to secure the services of qualified men who can devote time to this work, and some delay is unavoidable.

Regulation 33B

Up to June 30, 1943, the latest date for which figures are available, the number of persons reported as alleged sources of venereal infection by two or more persons under treatment was 110; and by the same date 71 of these had been brought under treatment by local authorities. About 220 other persons, out of approximately 1780 in respect of whom only one report reached medical officers of health, were induced to undertake treatment when informally approached. (Mr. H. U. WILLINK replying to Mr. A. PEARSON.)

Letters to the Editor

TREATMENT OF MYASTHENIA GRAVIS

SIR,—The letter by Laurent and Walker in the LANCET of Sept. 18 emphasised the importance of adequate treatment for patients with myasthenia gravis by the use of 'Prostigmin' (neostigmine *USP*). With this point of view we are in entire accord. Many patients are not receiving enough prostigmin to maintain a reasonable standard of health. A considerable proportion require 150–300 mg. of prostigmin bromide, correctly spaced throughout the 24 hours. The use of prostigmin must be regarded as a form of "substitution therapy," analogous to liver-extract treatment for primary anæmia or insulin for diabetes. Until this concept of treatment is grasped by the medical profession and by hospitals, many patients with myasthenia gravis will continue to suffer from unalleviated symptoms.

Since the discovery of the effect of prostigmin on myasthenia gravis by Walker in 1934, the drug has been used freely at this hospital on a large series of cases. Over 130 patients with this disease were seen between 1935 and 1943. In 100 of them data regarding their illness were complete. Some have been seen throughout the entire eight-year period; none was observed for less than a year. The majority of the patients are ambulatory and come to the clinic at the hospital; about 60 are seen periodically at intervals of 2–6 weeks. Ages ranged from 20 to 70 years. In the 100 cases there have been 22 deaths in the last 8 years. Exact figures for comparison with such a large series are unknown, but the mortality before 1935 was probably between 70% and 80% in any eight-year period. Many patients died within a few weeks or months of their initial symptoms. Few survived beyond the second year and rarely did a patient live for 10 years or more. Most of the 22 patients in our series who died, moreover, were in the later years of life.

The maintenance dose of prostigmin bromide, taken by mouth, is considerably larger than the one ordinarily referred to in textbooks. Of 45 ambulatory patients, seen during 1942–43, about half were maintained on 8–14 prostigmin bromide pills a day, each pill being 15 mg. Two patients in the series took no prostigmin bromide, both being in complete remission. One patient took 20 pills each day, another 25. The average intake was 10·9 pills each 24 hours, or 163·5 mg. of prostigmin bromide. In addition, 36 of the 43 patients who were taking prostigmin took ephedrine sulphate, in pills or capsules of 24 mg. each, the average being about 3 doses in 24 hours. Six patients took no ephedrine sulphate; one took 5 doses a day. Other drugs, such as potassium chloride or potassium gluconate and guanidine hydrochloride were less commonly used. Six patients took potassium in some form, the usual dosage being 4 g. two or three times a day. Five patients took guanidine (0·125 g.) three times a day. All patients came to depend on prostigmin bromide, by mouth, as the most efficient drug to offset the symptoms of myasthenia gravis. The other three drugs—ephedrine, potassium and guanidine—were always added to the prostigmin bromide dose, never being used alone. In many cases, after repeated observations, one or even all three of the drugs, except prostigmin, were omitted, as being of no value or because they were too difficult to take. Glycine, formerly used, is no longer taken by any patient in our entire series.

Ambulatory patients occasionally use prostigmin methylsulphate, 0·5 mg. (1 in 2000), by intramuscular injection. All patients with respiratory distress have written instructions from the clinic regarding the use of the drug in this form. Three or four of the 45 patients in the group studies resorted to intramuscular injections a few times a year. Two or even three ampoules of 0·5 mg. each may be used at one time, at the discretion of the patient's medical adviser, with or without atropine sulphate. Patients with myasthenia gravis usually evaluate their individual needs quickly and sense when and how much medicine is needed. Our tendency has been to teach the patient, as thoroughly as we can, the use and abuse of prostigmin in both forms, and allow them to make the ordinary decisions regarding dosage,

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a policy so successfully used in the treatment of the diabetic patient with insulin.

It is now well recognised that the amount of prostigmin taken each day by the patient to maintain a reasonably normal existence varies greatly. In most cases, it has been our experience that patients do not take enough prostigmin to be optimally maintained. In the most severe types of myasthenia gravis, patients can only be maintained on parenteral treatment. We have used as much as 25 mg. of prostigmin methylsulphate intramuscularly, plus 3 mg. of prostigmin methylsulphate intravenously in 24 hours. Under this large dosage, even at the end of 2 weeks of treatment, patients do not become tolerant to this drug, but as they pass from a relapse to a remission, a condition which must always be expected, the intramuscular and intravenous therapy may be gradually reduced and supplanted by oral treatment. The use of prostigmin bromide by mouth, however, is the usual way to treat patients with myasthenia gravis. Rarely is it necessary to use any other means, but in emergencies intramuscular and intravenous treatment should not be disregarded.

There are two important rules in the treatment of myasthenia gravis. First, maintain the patient adequately with prostigmin bromide, given by mouth and properly spaced through the day and night. Second, bend every effort to carry the patient through a relapse, as a remission is sure to recur, if intercurrent infection or some other disaster does not overwhelm him.

Myasthenia Gravis Clinic, Massachusetts General Hospital, Boston. HENRY R. VIETS.

MORE ABOUT THE NURSE'S PAY

SIR,—I was pleased to read your comments and criticisms of the second report of the Nurses Salaries Committee. In my view it leads us gently up the path towards the perfect totalitarian state. It also illustrates how often anomalies can be created as well as resolved. But there are several points in the report affecting the public health nurse which deserve discussion.

1. The Rushcliffe committee now draw a distinction between the scale salary of tuberculosis health visitors who possess a health visitor's certificate or diploma, as against those not possessing such certificate. I consider that some consideration should be shown to existing nurses who have all been appointed on the same basis. It seems invidious to make a distinction now between nurses who have given long and efficient service. Some of these long-service nurses possess the important certificate of the Royal Sanitary Institute—that is, they are sanitary inspectors as well as qualified nurses. Others have had considerable service in district work and in sanatoria, and have acquired sufficient knowledge and experience to carry out their duties every whit has satisfactorily as the later-joined nurses who have taken the health visitor's certificate. I contend that employing authorities should have the power to apply the £270–£360 scale to all existing staff if they so desire.
2. The committee recommend that the employing authorities should provide uniform free for all nurses employed in the public health services who are required to wear uniform, and specify that such uniform for non-resident nurses should be valued at £12 per annum for superannuation purposes. One gathers from this that the intention is to provide uniform free and as an addition to the salary, yet the annual salary is "inclusive of emoluments" (p. 44, table III), and as uniform normally is an emolument some clarification of this point is desirable.
3. Some nurses under the existing scales of local authorities are given an allowance for laundry. Income tax on such allowance is not payable, and presumably it will be open to a health visitor to claim her laundry bills as an expense of office. It would have been helpful if some figure could have been fixed for laundry so as to ease dealings with the income-tax authorities. In a modern tuberculosis clinic all health visitors attend pneumothorax refill sessions, run the artificial light department, undertake dressings, &c. Thus they at least will have white coats and white head-squares. It follows surely that the laundering of these should be met by the authority.
4. It is recommended that nurses in the public health services, other than school nurses, shall have three weeks' annual leave. The committee state that "School nurses are excepted, bearing in mind that their holidays are normally longer than this—a practice which we feel should continue." I consider the duties of tuberculosis health visitors are such that they are no less deserving of the longer holiday than the school nurses.
5. The Rushcliffe committee have not made any reference to the marriage of health visitors. Apparently a little crumb of discretion over the employment of married health visitors is still left with the employing authority.

It is certainly time that the non-resident nurse, forming an important section of the public health service, should have the general financial recognition now accorded her, for she is performing an important duty in and for the community. Her duties are likely to increase in quantity and quality.

County Offices, Preston. G. LISSANT COX.

POSTGRADUATE DEGREES

SIR,—Many Service medical officers are, I know, concerned about the opportunities which will be available to them for taking postgraduate courses after the war. I think this important matter should be emphasised. Many of us, before war broke out, would have liked to have taken postgraduate degrees, but at the call of the Services we had to give up these ideas, and also our jobs or practices, and in the case of married men our homes and families; and in fact we have made great sacrifices.

We do not know what the future holds. In contrast to this many young men in the Emergency Medical Services are sitting comparatively pretty and taking higher degrees. We hear of young people taking the MRCP examination six or twelve months after qualifying. These are the people who will have all the advantages in the postwar medical world. This seems unjust and it needs investigation, since it may cause bad feeling afterwards.

Home Forces. A SERVICE MEDICAL OFFICER.

RADIOLOGICAL APPOINTMENTS

SIR,—The council of my institute have recently had the opportunity to ascertain the feelings and views of a large number of radiologists who are at present serving with HM Forces overseas. Many of these officers who have been abroad for some years feel they may not for some time be in a position to put forward their views or to maintain touch with those bodies by whom radiological appointments may be made during and immediately after the war. Their interests may not be adequately considered and their position on return to civilian life may thereby suffer. I am instructed to bring these facts to the notice of such consultative and appointing bodies and to suggest that:

1. No radiological appointment be made for a longer period than the duration of hostilities.
2. Appointments made during the war, whether to British or alien nationals, be where possible made subject to review after demobilisation.
3. Such conditions of appointment, if in force, should be clearly brought to the notice of applicants by the terms of the advertisement or otherwise.

British Institute of Radiology, Welbeck Street, W.1. HUGH DAVIES, Hon. Med. Secretary.

BISMUTH PREPARATION FOR SORE THROAT

SIR,—For the last eight years I have adopted a routine treatment for the common sore throat which has proved highly successful. Briefly, it consists in the ntramuscular injection of the water-soluble bismuth salt, sodium bismuth thioglycollate ('Thio-Bismol' PDCo). The usual local treatment is an advantage, but apparently is not essential. Thio-bismol is in general use in syphilitic cases and has also been found of value in Vincent's infection, and in certain forms of malaria. I kept careful records of at least 50 cases in which bismuth was injected, but I have been unfortunate enough to lose them all through bombing. In my experience, one injection of 1 c.cm. (0·1 g.) of water-soluble bismuth during the first day of "sore throat" will cut short the attack. The febrile and other catarrhal symptoms involving the nose, pharynx and larynx are

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controlled and a second injection is rarely required. Patients usually report improvement within an hour and recovery in 12 or 24 hours after the injection. Elderly patients with chronic or recurrent sore throat gain comfort from the injection. Often the frequency and severity of their "colds" is diminished for long periods. Excellent results in chronic inflammatory swellings of the arytenoids, vocal cords and lingual tonsil can also be obtained. No ill effects have been observed except for an occasional ache in the muscle, which has disappeared on the application of warmth. Acute diarrhœa occurred in two cases within an hour of the injection, but this was soon under control.

London, W.1. WILLIAM LLOYD.

TERMINOLOGY

SIR,—In your leader of Nov. 27 you say, "Had St. Thomas Aquinas known Greek and—as we are sure Sir Almroth [Wright] would have advised—retained Aristotle's technical words for what became in common parlance substance and form, fewer human beings would have been burned alive." The facts are that St. Thomas employed a translator who provided him with an excellent translation of both the *Physics* and the *Metaphysics*, the two books of Aristotle in which the concepts of matter and form are developed. The translation is frequently closer to the original than either the Loeb or the Ross translation into English. Anyone who knows Greek, Latin and English can check this: I have done so. Furthermore St. Thomas, to avoid ambiguity, frequently retains the original Greek word in his *Commentary on the Metaphysics*, and he is most scrupulous to define clearly what Aristotle meant by the word or phrase used in the light of his other writings.

It is therefore strange that you should acouse this very careful scholar of making an error with regard to two such important words as matter and form. Are you perhaps accepting too credulously the statements of Duhan, which are certainly open to contradiction? The further step which relates this supposed mistake to the frequency of burning puzzles me. Are you under the impression that people have been burned by religious authorities for refusing to subscribe to a philosophical thesis? If this has happened I should like to have particulars.

University College, Dublin. T. W. T. DILLON.

*** We did not accuse St. Thomas of making an error, but expressed the opinion that it would have been better in a technical argument to have retained the Greek terms and not replaced them by equivalents in the language of all readers, to wit Latin. *Forma*, for instance, was a word often used by good Roman writers in very much the sense it bears in our own non-technical literature, not in the specialised sense of *οὐσία* or even *εἶδος*. "Far-off writing" might be an equivalent of telegraphy, but a bad one; it has the wrong colour.—ED. L.

MINIATURE RADIOGRAPHY

SIR,—I have read Dr. Henderson's letter in your issue of Dec. 11 with some apprehension. In this letter he quotes a factory medical officer as saying that he was "under the same responsibility regarding medical secrecy as any other doctor." "He or she is only entitled," the quotation continues, "to convey information regarding disease in members of the factory to the managing director, or his nominee, where it is a matter that affects the health of the factory workers generally, or the individual's efficiency." I find it difficult to reconcile these two statements. It would only be permissible for a factory medical officer to convey information to any member of the management if he had first obtained the permission of the individual concerned. It is difficult enough to assure factory workers that the factory medical officer is subject to the same obligation of secrecy as the worker's own doctor and a statement such as the above is unfortunate. I can only hope that Dr. Henderson misunderstood the factory medical officer.

Association of Industrial Medical Officers. JOHN C. BRIDGE, Chairman.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export.

Obituary

ARTHUR EDWIN HORN

KT, MD LOND, MRCP, DTM

Sir Arthur Horn, consulting physician to the Colonial Office, died at his home at Limpsfield on Dec. 19, at the age of 73. He was the son of William Horn of Forest Hill and was educated at Westminster City School and at St. Mary's Hospital, where he graduated in 1899. After serving as civil surgeon in a brigade field hospital during the South African war he joined the West African medical staff in 1904 and served on the Gold Coast, in Nigeria and Gambia. In 1908 he was awarded the Craggs prize for research in tropical medicine and the same year he presented a valuable report on cerebrospinal fever in the Northern Territories and in 1910 another on sleeping-sickness in the Volta river district. During the last war he acted as principal civilian medical officer in German East Africa and in 1920 he joined the Rockefeller Commission for the investigation of yellow fever in West Africa. Two years of service as DMS in Malaya followed till in 1923 he was appointed medical secretary to the advisory and sanitary committee of the Colonial Office, and later a junior medical adviser. When he retired in 1928 he became consulting physician. His wide experience was valued at the meetings of the executive committee of the British Empire Relief Association and his articles in our own columns in 1912 on the health of Europeans in West and East Africa were a valuable epidemiological record.

P. M.-B. writes: "Arthur Horn was one of those quiet, persistent solid people who are the stable element of a community or profession. Deeply attached to clinical medicine he was a sound and trustworthy physician, who held his way serenely through life unruffled by personalities or disappointments. His pleasing address and winning smile went with considerable organising ability and made him a good committee man and an ideal secretary, and when he spoke it was to utter sound and common-sense advice."

JOHN SWIFT JOLY

MD DUBL, FRCS

Mr. John Swift Joly, who died on Dec. 14 at the age of sixty-seven, was the younger son of the Rev. John Swift Joly, rector of Athlone, and the family name recalls that his great-great grand father married a sister of Dean Swift.

He entered Trinity College, Dublin, in 1894. His first bent was towards engineering, which was not surprising as his elder brother, Charles Jasper Joly, a fellow of Trinity, was at that time Astronomer Royal for Ireland, and his famous cousin, John Joly, FRS, inventor of the bomb calorimeter and a pioneer in colour photography, was assistant professor of physics and later professor of geology in the university. Half-way through his undergraduate course, however, Joly decided to take up medicine, a decision he never regretted. He finished his arts course, none the less, by taking his moderatorship in experimental science with the highest possible honours, which corresponds with the honours BSc of other universities. This training in scientific thought coloured his mind, and proved useful when he was developing his views of the chemistry of stone formation and working out the optics of the urological instruments he later invented.

With this background it was not surprising that Joly was one of the most brilliant medical students of his year. He qualified in 1902 and after holding a house-surgeoncy at Sir Patrick Dun's Hospital, he went abroad with a surgical travelling scholarship to work under Kocher at Berne and in the surgical clinics at Vienna. His first appointment in London was as house-surgeon at the Lock Hospital, his second as house-surgeon at St. Peter's Hospital, and these two posts settled his future

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career. He decided to practise in London, and took the FRCS in 1907. Shortly afterwards, owing to the resignation of Hurry Fenwick, he was appointed to the staff of St. Peter's, where his colleagues were P. J. Freyer, Swinford Edwards, John Pardoe and John Thomson-Walker. Fierce controversies then raged over the possibility of complete removal of the prostate, and priority in the invention of prostatectomy. Freyer and Thomson-Walker fired the shots for St. Peter's. Joly, quietly in the background, supplied the ammunition.

In the last war he served in Palestine as surgical expert at the 47th Stationary Hospital, Gaza, with the rank of major RAMC. Returning to London he resumed his work at St. Peter's in 1919, and was elected surgeon to outpatients at the Lock Hospital in 1920. He retired from this post a few years later, and the rest of his surgical life was centred round St. Peter's. He had the reputation of a steady, competent surgeon, with a wide scientific outlook. As an operator he was careful, perhaps a little slow, but his judgment was always sound. He handled the cystoscope which bears his name with dexterity. His writings were not many, but what he wrote carried conviction, for it was based on wide reading, clear thinking and much experience, and *Stone and Calculous Diseases of the Urinary Organs*, published in 1929, made his reputation international. At the time of his death he was engaged on a similar work on *Diseases of the Kidney*, which unfortunately has not been completed.

Joly was a prominent member of the Masonic Order, and had been master of the TCD lodge in London. He was a member of the Savage Club, and delighted to invite his colleagues to the Saturday evening dinners. He was also a keen golfer and an expert photographer. With his wife and son, now serving as a surgeon lieutenant RNVR, Joly spent most of his holidays mountaineering in Switzerland. In private life he was quiet and reserved, with sudden flashes of Irish wit when least expected.

GORDON WORSLEY BELLIS

MRCS; FLIGHT-LIEUTENANT RAF

Dr. Gordon Bellis, who was killed on active service in Sicily during September, was the only son of Mr. and Mrs. H. Bellis of Eastcote, Middlesex. He was educated at Dover College and at Oxford where he studied arts before he entered Charing Cross Hospital medical school in 1935. He qualified in October, 1940, and held the post of house-physician, and later of resident obstetric officer at Ashridge Hospital, where he showed great promise and aptitude. He received his commission in the Royal Air Force in 1941 and at the time of his death was medical officer to a squadron operating overseas. Bellis was a keen freemason and a member of the hospital lodge, joining from his old school lodge, in which he held office. He leaves a widow.

WILLIAM JAMES FAWCETT

CB, MB DUBL; MAJOR-GENERAL

Major-General Fawcett, who died on Dec. 1 in his 96th year, was a link with a past which he himself helped to change. When he was first posted to India, shortly after graduating from Trinity College, Dublin, in 1870, hospitals there were small and ill equipped and the nursing was done by orderlies drawn from the regiments. There was little medical work, for diseases such as malaria, typhoid, dysentery and cholera were regarded as inevitable. Fawcett soon won for himself a reputation as a surgeon and anæsthetist at a time when the administration of chloroform in the tropics was still held to be a dangerous experiment. In the face of opposition from regimental officers he was successful in the original British station at Bangalore, and later he was appointed to the station hospital at Poona where he was thanked by the government of Bombay for his work in suppressing plague. In 1899 Fawcett was appointed principal medical officer in Egypt and in 1903 returned to Ireland to take up the same appointment there. Then he found his early experience at Bangalore valuable and in his work for the merging of many small hospitals into a large central one he was helped by Sir Frederick Treves and Sir Charles Ball. In 1905 he was appointed deputy director of Army Medical Services under Keogh, when the detailed work of setting up medical services for the new Territorial Army fell largely to him. After his retirement three years later he settled in his old home in co. Leitrim and in natural course was appointed justice of the peace, deputy lieutenant and high sheriff, but in the troubles of the early twenties he moved to Devon. Though he was a judge of horseflesh and a skilful horseman, horses did not appeal to him except as a means of transport. He was a good rough shot and proud of a prepandial record of 23 snipe for 25 cartridges, but fishing was his passion and when over eighty he would walk four miles, fish all day and walk home with his basket of trout. He is survived by his son Colonel H. H. J. Fawcett, late RAMC, and two daughters. One of his two grandsons is a captain in the RAMC and the other, newly qualified, hopes to join within weeks. They are continuing a chain of family service unbroken for over seventy years.

LAURENCE TEMPLE BOND

MB CAMB

Dr. L. T. Bond, who died at his home at Westcliff-on-Sea on Dec. 1 at the age of 37, went up to Caius College, Cambridge, in 1924 with a scholarship from Sherborne, and gained a first-class in part II of the pathology tripos. He was the university entrance scholar of St. Thomas's Hospital in 1928. He qualified in 1931, after winning the Bristowe Medal in pathology, which he had already chosen as his specialty, and after acting as casualty officer and house-physician to Sir Maurice Cassidy, took a research post in the laboratory of the late Prof. L. S. Dudgeon. A period as assistant at the Royal Sussex County Hospital followed and later he was appointed to take charge of the pathological department at the Southend General Hospital. In 1940 Bond joined the EMS and was posted to the Herts County Hospital and to an EMS hospital in the same sector.

His athletic career was even more outstanding. While at Cambridge he took up pole-vaulting. He was awarded his half-blue in 1927 and won the event against Oxford a year later. In 1928 he was selected to represent this country at the Olympic Games at Amsterdam. In 1930 he set up a new English native record with a vault of 12 ft. 6 in. He competed at the Empire Games in Canada and the AAA championships and during 1928–31 was a regular performer for the Achilles Club and the United Hospitals AC.

N. L. R. writes: Laurence Bond's crisp, practical mind and balanced judgment made his opinion much valued by his colleagues, and he had a disconcerting knack of probing the weak point of an argument. Although he was inclined to be conservative he was not unreceptive to new ideas, and was one of the first to explore the possibilities of sternal puncture in blood disorders. He wrote well and his contributions to medical literature included a masterly account of congenital hæmorrhagic telangiectasia and, in collaboration with Mr. Aleck Bourne, a study of the changes in the cervix uteri in chronic leucorrhœa. He enjoyed life to the full and his enthusiasm for work and sport was infectious. He was a keen entomologist and had acquired a good representative collection of British butterflies. He leaves a widow and two daughters.

Dr. JOHN HARVEY KELLOGG, founder of the Battle Creek Sanitarium, died there on Dec. 14 in his 92nd year. Apart from the years spent to qualify in New York he lived his whole life in Michigan, where his influence was enormous—as an evangelist of good health, teacher and prolific writer, founder and professor in the medical school, member of the State Board of Health, pioneer of electrotherapy, and president of the Race Betterment Association. The names of his published works occupy the better part of two columns in the Surgeon General's catalogue and thirty years ago we expressed the hope that his little book on *The Body in Health* would find its way into the hands of our own school teachers.

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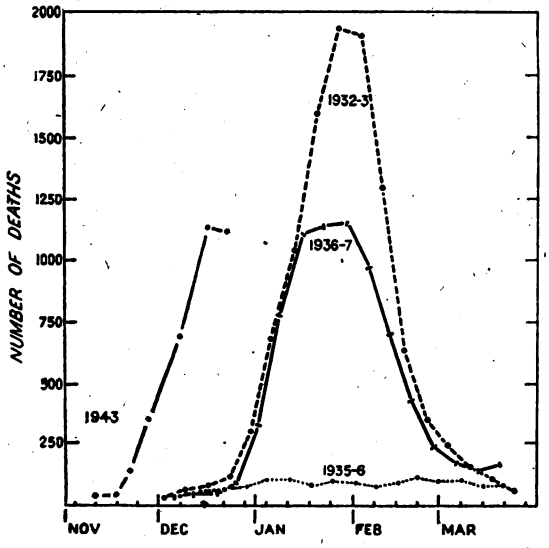
Public Health

The Influenza Epidemic

The Christmas news was good also on the influenza front. The number of deaths reported during the week ended Dec. 18 was 39 fewer than in the previous week. So far then the 1936–37 peak has not been reached—by



Weekly Deaths from Influenza in the Great Towns of England and Wales

Week ended	AGGR.	Lond.	Grtr Lond.	NORTH	MIDL.	Manc.	B'fd	B'hm	B'tol
Nov. 13	46	6	16	19	12	4	2	2	4
20	106	10	16	56	24	4	7	1	9
27	375	29	71	172	81	44	17	20	18
Dec. 4	709	72	181	288	157	47	11	57	16
11	1148	128	349	449	248	62	28	73	22
18	1109	127	358	433	229	50	21	60	17

a hair's breadth. Nearly all the largest towns have had remissions, Croydon and Liverpool being the noteworthy exceptions; but many towns in the Outer Ring and in the Midlands have had some increase, and towards Wales the lag is general. As far as London is concerned the victims have been limited even more than before to the higher age-groups, the formula being 0-0-1-1-0-1-4-8-22-41-51.

Infectious Disease in England and Wales

WEEK ENDED DEC. 18

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 1936; whooping-cough, 1400; diphtheria, 550; paratyphoid, 1; typhoid, 3; measles (excluding rubella), 416; pneumonia (primary or influenzal), 2593 (last week 2967); puerperal pyrexia, 132; cerebrospinal fever, 64; poliomyelitis, 6; polio-encephalitis, 1; encephalitis lethargica, 4; dysentery, 133; ophthalmia neonatorum, 83. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Dec. 15 was 1900. During the previous week the following cases were admitted: scarlet fever, 135; diphtheria, 38; measles, 22; whooping-cough, 60.

Deaths.—In 126 great towns there were no deaths from enteric fever, 1 (0) from scarlet fever, 1 (0) from measles, 13 (2) from whooping-cough, 16 (1) from diphtheria, 42 (7) from diarrhœa and enteritis under two years, and 1109 (127) from influenza. The figures in parentheses are those for London itself.

The number of stillbirths notified during the week was 208 (corresponding to a rate of 34 per thousand total births), including 20 in London.

Notes and News

RETURN OF SHORT-SERVICE COMMISSIONS

Short-service commissions are again to be granted to medical and dental officers in the Army. These will have effect from the date of the officers' appointment to an emergency commission in the RAMC or the ADC, or the date of his embodiment on full pay (Supplementary Reserve or Territorial Army) or date of his recall to service (Regular Army Reserve of Officers on the Territorial Army Reserve of Officers), provided there has been no break in service. After holding a short-service commission in the RAMC for 5 years, or in the ADC for 6 years, an officer may be selected for a permanent commission. Those not selected will be eligible for gratuities on retiring, provided they have remained at least 2 years in the Service after the statutory date of the termination of the war.

ROEHAMPTON GROWING

SINCE it was opened in 1915 as a convalescent auxiliary hospital, Queen Mary's, Roehampton, has steadily bettered its own achievement. The beds rose in numbers from the modest 25 of the start to 900 by 1918, and the hospital soon became world-famous as a centre of treatment for crippled soldiers, and especially for studios devoted to artificial limb-making. Until 1925 these were its main duties; more than 26,000 soldiers treated there were supplied with their first and second limbs, or attended for renewals and repairs of such limbs. After that the Ministry of Pensions began to use part of it for the treatment of facial cases and of general surgical and medical cases; new wards and theatres were built to receive them. In 1936 a fresh step was taken; Roehampton's experience was made available to civilians, especially railwaymen and miners, who are injured in the course of their employment. Building had been going on, as necessary; the old huts where the limbs were made have been replaced by new brick quarters; and at the beginning of this war new wards, an underground theatre and resuscitation rooms were made ready to deal with air-raid casualties.

The hospital is now at the service not only of members of the Forces and nurses and civilians disabled by war, but of civilians who fall under the Ministry of Labour's rehabilitation scheme for civilians other than war cases, and for children both under five and of school age. The whole nation, in fact, has now the right to share in the fine care offered by this lively and vigorous hospital which, like a well-disposed baby, has never looked back.

THE FUTURE OF SCIENTIFIC FILMS

ON Nov. 20 a new body—the Scientific Film Association—was formally constituted, under the presidency of Mr. Arthur Elton, with the aim of promoting national and international use of scientific films. Other members of a distinguished committee are Mr. H. L. Beales of the London School of Economics, Mr. Paul Rotha, Mr. Oliver Bell, director of the British Film Institute, and Mr. W. McAdam Eccles, FRCS. The association has devised short-term and long-term plans which range from a modest determination to get a small office and a secretary to a full-blown vision of international conferences, courses in film technique for scientists, a private theatre for the use of film societies, and the issue of a journal. In the meantime it should be possible to study potential sources of films and the uses which might be made of them, to arrange private shows of important films, to help to establish libraries, and to review and classify existing films. These useful activities should keep the SFA busy for the moment and give them time to develop their resources. We wish them well.

THE MASSEUSE ON THE PLASTER TEAM

IN a lecture to the Wiltshire branch of the Chartered Society of Massage and Medical Gymnastics, Mr. A. G. Ord, surgeon in charge of orthopædics at the Royal Portsmouth Hospital, said that fracture clinics might well be extended to cover other types of accident, since the same methods of treatment are apposite to most types of accidental injury. He believes that rehabilitation should begin from the moment the patient enters hospital. For nine years he has drawn his plaster team from members of the massage department, considering that their knowledge of anatomy and limb function makes them peculiarly well qualified for this work. When the fracture has been reduced the plaster team apply the plaster and make themselves entirely responsible for it, under the surgeon's direction. The plaster assistant gets so keen on her cases, owing to this opportunity of seeing them

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completely through, that she takes a personal pride in the success of the plaster, and corrections or alterations are rarely necessary. The patient, being under the continuous care of one masseuse, responds to her suggestions and early begins to help himself. When the plaster has set, a second radiogram of the fracture is taken and is examined by the surgeon jointly with the member of the plaster team who has undertaken the case. The movements which the patient can be encouraged to undertake are agreed upon; and when the time comes for changing the plaster there is no doubt in the mind of masseuse and patient of the progress which may reasonably be expected. The patient realises, through the encouragement of the masseuse, that he is himself responsible for return of function.

University of Liverpool

At recent examinations the following were successful:

FINAL EXAMINATION FOR MB, CH B

A. H. Swithinbank (with second-class honours).

Part III.—J. Ainsworth, A. S. Beadel, K. W. Boggis, A. M. Brenner, E. F. B. Cadman, Constance M. Davis, P. S. Dearden, Margaret P. Diamond, E. G. Donovan, J. F. Ferguson, H. Francis, J. Gould, Betty Hargreaves, E. T. Harrison, H. Holden, Winifred L. Hollick, C. A. Hopkins, J. G. P. Jones, J. D. King, J. Langley, V. Leitner, A. McPherson, W. E. S. Marshall, J. W. Maybury, Janet B. Mercer, Sheila L. Richardson, J. J. Rivlin, Irene W. Simpson, W. Sircus, C. Taylor, K. B. Thomas, D. W. Townley, Simone J. van Son, J. G. Warbrick, Elspeth M. Whittaker, Margaret A. Williams, and F. B. Wright.

Royal College of Surgeons of Edinburgh

At a meeting of the college held on Dec. 17, with Prof. R. W. Johnstone, the president, in the chair, the following were admitted to the fellowship:

A. C. Buchan, LRCPE; M. L. Burman, MB PATNA; V. H. J. Davies, MD LOND; J. C. Dundon, MB NUI; G. R. Fisk, MB LOND; Thomas Fletcher, MD GLASG; R. H. Foster, MB CAMB; M. D. Hickey, MB NUI; W. D. Lovelock-Jones, MB WALES; W. E. Pollett, MD DALHOUSIE; G. I. Roberts, MB LPOOL; and D. F. Walsh, MB DUBL.

Society of Apothecaries of London

Sir Stanley Woodwark, master, was in the chair at the Christmas court held on Dec. 14, when Surgeon Rear-Admiral C. P. G. Wakeley was elected to a seat on the court. The following were elected to the freedom of the society by redemption: G. F. Longbotham, C. D. Sanders, and R. N. Theakston. G. J. L. Hamilton was bound apprentice to C. J. B. Way. The diploma of the society was granted to C. M. F. Fiducia and S. Yaffe.

Course for the DPM

Lectures on the anatomy and physiology of the nervous system, suitable for those intending to take a diploma in psychological medicine, will be held at the Maudsley Hospital, Denmark Hill, London, S.E.5, during January, on Mondays, Wednesdays and Fridays at 2 PM. Further particulars may be had from Dr. W. W. Kay, Central Pathological Laboratory, West Park Hospital, Epsom, Surrey.

Royal Society of Medicine

On Tuesday, Jan. 4, at 2.30 PM, the section of pathology will meet at University College Hospital medical school, London, W.C.1. On the same day at the house of the society, 1, Wimpole Street, W.1, short papers will be read at a meeting of the section of orthopædics. Mr. Geoffrey H. Bourne, D SC, will speak on the relative importance of periosteum and endosteum in bone healing and the relationship of vitamin C to their activities; Mr. P. B. Roth on a case of osteochondroma of the knee-joint; Mr. Denis Browne on calcaneus position of the foot; Major G. Hammond, USAMC, on fracture dislocations of the hip; and Major J. G. Bonnin on the hypermobile ankle; and Mr. R. G. Pulvertaft will show a film of tendon suture of the hand. On Jan. 5, at 2.30 PM, Dr. S. Daukes will read a paper to the section of history of medicine on the historical medical museum—its future and possibilities. The section of surgery is holding a clinico-pathological meeting at 4.15 PM on the same day. The programme for the meeting of the section of neurology on Jan. 6, at 2.30 PM has been arranged by members of the staff of a Canadian neurological hospital. Lieut.-Colonel J. C. Richardson will describe clinical experiences in a RCAMC neuropsychiatric ivision in England; Major W. C. Keith two cases of spinal extradural scar producing paraplegia; Major J. A. Walters some aspects of the treatment of parkinsonism; Major A. W. Stewart contrecoup lesions in the relatively severe craniocerebral injuries; and Major B. C. Eaglesham will demonstrate a neuroradiological exhibit. On Jan. 7, at 2.30 PM, Major G. C. Steel and Major J. H. T. Challis will give the section of anæsthetics an account of their experiences in France and Germany.

Medical Education Tomorrow

Speaking at a graduation ceremony at the University of Manchester on Dec. 17, Sir John Stopford, FRS, the vice-chancellor, said that important reforms and developments in medical education were coming. Effort would have to be made to give teachers in clinical subjects the opportunities for research enjoyed by their colleagues who taught preclinical subjects. Whatever the future pattern of medical service the general practitioner would take a more active part in public health and every medical student would have to be trained for this task throughout the preclinical as well as the clinical part of his course. The medical profession's first duty was to promote and maintain mental and physical health, an outlook more positive than the prevention of disease which itself took precedence of curative medicine and rehabilitation. To secure this a change of emphasis in the content of the medical course would have to be arranged. Work, food and the home had all important effects on health, and Sir John was encouraged to see departments of child health and social medicine being set up in different parts of the country. He looked forward to the day when the University of Manchester would also have vigorous departments in these two subjects.

Medical Casualties

The following casualties among RAMC officers have been announced:

Wounded—Captain L. C. Montgomery, MD BELF.; Captain B. C. Rowlands, MB LOND.; and Major J. D. Sprague, LMS NOVA SCOTIA.

British Association of Otolaryngologists

An association of Otolaryngologists has been formed under this name. The officers are: president, Mr. W. M. Mollison; vice-president, Mr. Lionel Colledge; treasurer, Mr. V. E. Negus; and secretary, Mr. F. C. Ormerod, 22 Upper Wimpole Street, London, W.1.

Births, Marriages and Deaths

BIRTHS

EDE.—On Dec. 15, the wife of Dr. W. O. Moore Ede, of Tunbridge Wells—a daughter.

LATTER.—On Dec. 20, in London, the wife of Squadron-Leader K. A. Latter, MD—twin daughters.

MARTIN.—On Dec. 17, at Welwyn, Herts, the wife of Captain W. Desmond Martin, RAMC—a daughter.

ROBINSON.—On Dec. 18, at Rustington, the wife of Lieut.-Colonel J. T. Robinson, RAMC—a daughter.

SNELL.—On Dec. 18, at Northampton, the wife of Dr. W. E. Snell, of Colindale Hospital—a daughter.

STREET.—On Dec. 16, in London, the wife of Captain E. W. Street, RAMC—a daughter.

TAYLOR.—On Dec. 23, in London, Dr. Charity Taylor (née Clifford), wife of Stephen Taylor, MD—a daughter.

WEDDELL.—On Dec. 17, in Oxford, the wife of Captain A. G. McD. Weddell, RAMC—a daughter.

MARRIAGES

HOLLINGS—GREENAWAY.—On Dec. 22, at Rodborough, Geoffrey Bevan Hollings, MD, major, RAMC, to Joy Greenaway, WRNS.

MACKEITH—BARTRUM.—On Dec. 18, in London, Ronald Charles MacKeith, surgeon-lieutenant RNVR, to Elizabeth Mary Bartrum.

MASSINGHAM—GOSSELIN.—On Dec. 21, in London, Richard Massingham, MRCS, to Betty Gosselin.

DEATHS

ANDREWS.—On Dec. 19, at Birkdale, Archibald George Andrews, FRCS.

CLAYTON.—On Dec. 18, John Cecil Clayton, MRCS, of Burley, Hants, formerly of Cricklade and London.

GOSTWYCK.—On Dec. 20, at Amersham, Bucks, Cecil Hubert Gostwyck Gostwyck, MB EDIN., FRCP, DPM.

HUNT.—On Dec. 23, at Haslemere, Surrey, Arthur Henry William Hunt, MBE, MRCS, aged 77.

JACKSON.—On Dec. 19, at Mayfield, Sussex, Mark Jackson, MD RUI, formerly of Barnstaple and Purley, aged 88.

KENNISH.—On Dec. 25, at Great Missenden, Thomas Looney Kennish, MD EDIN., formerly of Winslow, Bucks.

MARR.—On Dec. 17, at Falmouth, Colin Forbes Marr, MB ABERD., lieut-colonel IMS retd., aged 65.

MCLOUGHLIN.—On Dec. 27, George Somers McLoughlin, CMG, DSO, MB DURH., major-general AMS retd., formerly of Goudhurst, Kent, aged 76 years.

ORAM.—On Dec. 19, Evelyn Henry Bardens Oram, MB LOND., FRCS, of Blackheath.

PHIPPS.—On Dec. 18, at Richmond, Surrey, Edgar Vivian Ayre Phipps, MRCS, lieut-colonel late RAMC, aged 86.

POOLEY.—On Dec. 20, at Bowness on Windermere, William Pooley, FRCSI, formerly of Rochdale and Chew Magna, Somerset, aged 91.

WAINWRIGHT.—On Dec. 22, at Gerrards Cross, Lennox Wainwright, MD BRUX., MRCS, formerly of Folkestone and Harley Street, W.1, aged 80.

WELHAM.—On Dec. 24, in London, George Sydney Welham, MRCS.

WHAITE.—On Dec. 15, at Northwood, Thomas du Bedat Whaite, CB, CMG, MB DUBL., colonel late RAMC, aged 81.

WILLIAMS-FREEMAN.—On Dec. 20, at Thruxton, near Andover, John Peere Williams-Freeman, MD DURH., JP., aged 85.

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SULPHONAMIDE DERMATITIS
SENSITISATION FROM LOCAL APPLICATION

BERNARD C. TATE, M A, M D CAMB, F R C P
LIEUT.-COL. RAMC; ADVISER IN DERMATOLOGY, MEF; PHYSICIAN I/C SKIN DEPT, QUEEN ELIZABETH HOSPITAL, BIRMINGHAM

I. KLORFAJN, M D BRUSSELS
CMP ATTACHED TO A MILITARY HOSPITAL, MEF

MOST of the toxic reactions to internal administration of sulphonamides are now well known; but ill effects from external use of these drugs seem to be less generally recognised. In the literature accessible to us, admittedly limited, we have found no actual record of such effects, though Ingram (1942) gives a strong warning that local application of sulphonamides may produce sensitisation. Accumulating experience shows this risk to be very real and of great practical importance. In this paper epidermal sensitisation, with eczema reaction, produced by local sulphonamide therapy is described, and its implications are briefly discussed.

INCIDENCE

The proportion of patients receiving local sulphonamide therapy who become sensitised is not known; but since the condition was first recognised by one of us (B. C. T.) some two years ago, we have seen a steadily increasing number of such cases. In the six months from October, 1942, to March, 1943, out of a total of 2280 admissions to the skin department of a military general hospital, 55 were cases of sulphonamide dermatitis produced by local applications of these drugs.

CLINICAL FEATURES

The clinical course was similar to that generally followed in cases of epidermal sensitisation caused by local contact. After a period of sulphonamide applications to some skin disease or minor injury, an irritating dermatitis appeared. At first it was confined to the area under treatment ("primary eruption," figs. 1 and 2), and in 2 cases it remained so localised; but in the rest, after varying periods, other regions, to which no sulphonamide had been applied, became affected ("secondary eruption," figs. 3 and 4). The secondary eruption usually had the distribution commonly seen in sensitisation to other chemicals, but in 4 cases it was strictly limited to areas exposed to light, and in 2 others, though covered areas were affected, it was specially severe on the exposed parts.

The dermatitis was always eczematous—i.e., an inflammatory reaction with œdema of the skin, and innumerable intra-epidermic vesicles scattered throughout the affected area.

Some cases, on admission, presented a more or less generalised weeping eczema; but the severity varied a good deal, depending, it seems, very largely on the length of time sulphonamide therapy was continued after sensitisation had been established. Constitutional symptoms were commensurate with the extent and severity of the eruption. Several temperatures of 102° and 103° F. were recorded.

NUMBER OF APPLICATIONS NECESSARY TO CAUSE SENSITISATION

This was very variable, and difficult to assess. There was not always a record of the date on which sulphonamide treatment had been started, and many patients were rather vague about the date when irritation was first noticed. In 30 cases the interval between commencement of sulphonamide dressings and onset of dermatitis was known fairly accurately:—

Period of treatment before onset of symptoms	*Number of cases*
4–7 days	11
7–14 days	10
Over 14 days	9

One patient had received treatment on and off for three months, and another for four months, before becoming sensitised.

NATURE OF ORIGINAL DISEASE

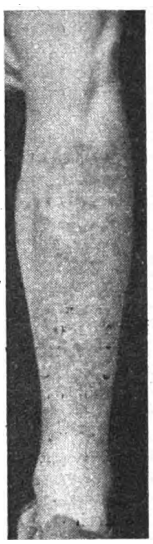
This is important. The following is an analysis of 55 consecutive cases.

Disease	*No. of cases*	*Disease*	*No. of cases*
Impetigo	15	Gunshot wound	2
Ecthyma	12	Cuts (superficial)	2
Abrasions	8	Septic scabies	1
Septic insect bites	4	Folliculitis of neck	1
Boils	3	Cutaneous leishmaniasis	1
Minor burns	2	"Septic foot"	1
Eczema	2	Ulcer on old osteomyelitis scar	1

In one of the cases of gunshot wound the wounds were multiple and of moderate depth. During the whole period since the condition was first noted, this is the only case seen resulting from sulphonamide treatment of wounds of any severity. No case has been seen complicating severe burns.

PREDISPOSITION

It will be noted that in 2 of the foregoing cases the patient was already suffering from eczema. Another gave a history of varicose eczema 15 years previously, and one a history of an itching dermatitis 15 years before. There were no histories, either family or personal, of asthma, hay-fever or migraine. No case has yet been seen in an ichthyotic. "Seborrhœic manifestations," such as marked dandruff or mild folliculitis, were noted in 11 cases—probably no greater proportion than in the general military population. There was no special preponderance of either fair-skinned or dark-skinned subjects. It does not seem, in fact, that any recognisable constitutional predisposition is necessary for the development of sensitisation to sulphonamides; and this is the general experience with sensitisation to other chemicals.



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2

Fig. 1—Dermatitis in area of sulphanilamide dressing which had been applied to ecthymatous ulcers ("primary eruption").

Fig. 2—Shows "primary" eruption on back and radial side of right wrist, caused by applications of sulphanilamide to "desert sore"; with "secondary" eruption on forearm and hand.

PREPARATIONS CAUSING DERMATITIS

Sulphanilamide had been used in most cases, but in 3 sulphapyridine appeared to be the offender. Pastes, ointments and powder had been used in different cases. We were unable to find any evidence suggesting that any one of these preparations is more likely than another to cause dermatitis.

DIAGNOSIS

The diagnosis was suggested by the history, character and distribution of the eruption, and confirmed by (1) patch-tests, and (2) oral administration of sulphonamides.

Patch-tests were performed with sulphanilamide, sulphapyridine and, in some cases, sulphathiazole in soft paraffin. In 3 cases the sensitising agent was (according to the history) sulphapyridine, in the others it was sulphanilamide; yet all cases so tested gave a positive patch-test reaction to both drugs. On the intact skin very strong concentrations were necessary to evoke a positive reaction, and even then the response was generally weak; but after light scarification of the horny layer very strong positive reactions were easily obtained. The reaction to sulphanilamide was much stronger than that to sulphapyridine when the tests were applied to intact skin; but after scarification the difference was only slight and in some cases non-existent. Sulphathiazole evoked no response on intact skin; it has not yet been tried on a scarified area.

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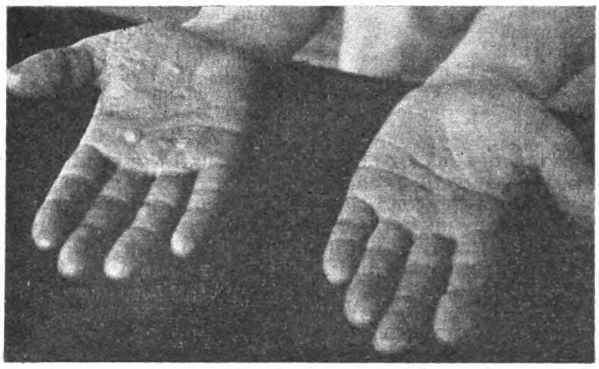

Fig. 3—Secondary eruption on hands: same patient as Fig. 2.

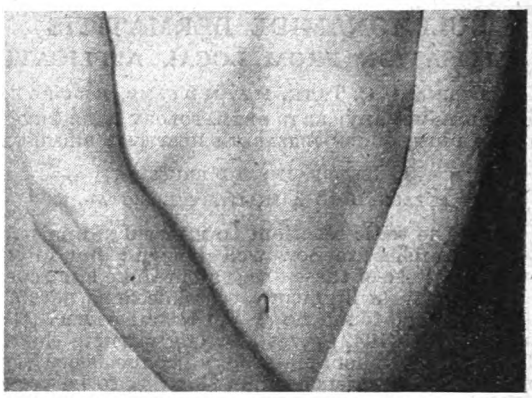

Fig. 4—Secondary eruption on arms and forearms. "Primary" eruption was on right shin. Caused by sulphanilamide dressings to an abrasion.

Patch-tests were interpreted as positive only if the reaction was eczematous—i.e., characterised by redness, œdema and formation of multiple intra-epidermic vesicles (fig. 5).

The 2 patients whose dermatitis had been limited to the areas actually treated with sulphanilamide showed no reaction to patch-tests applied to other areas—a not uncommon finding in contact dermatitis. In both cases the diagnosis was clinched by internal administration of the drug. In 3 other cases, whose diagnosis seemed certain, patch-tests proved negative even when applied to the original sites of the eruption. The significance of this is discussed later.

"Accidental patch-tests" were performed in 3 cases with strongly positive results. In 2 of these sulphanilamide powder was dusted, in error, over operation wounds. The other was a patient sensitised to sulphanilamide. Some four months after his dermatitis had disappeared, sulphapyridine was applied to a septic insect bite, causing an intense local dermatitis and a milder patchy general reaction.

Internal administration of sulphonamides to sensitised subjects.—In all cases so tested, the 3 with negative patch-tests excepted, this produced a recrudescence of the eruption. It revealed more clearly than patch-tests the differences in degree and extent of sensitisation. In the 2 cases with no "secondary" eruption the recrudescence was strictly confined to the areas of the original sulphanilamide dressings. In others the areas of both primary and secondary eruptions broke out (figs. 6 and 7), including areas of patch-tests, while in some, previously unaffected skin broke out too (fig. 8).

As sometimes happens in other varieties of contact dermatitis, non-specific irritation of the skin seemed to increase the sensitivity to sulphanilamide. Thus 1 patient developed mild dermatitis under the strapping used for the patch-tests. Subsequent administration of sulphanilamide, when all traces of dermatitis had disappeared, produced an acute vesicular eczema in the areas previously affected, in the areas of the patch-tests and also in the areas which had been irritated by the strapping (fig. 9).

Previous long-continued exposure to sun had a similar influence. In 2 patients, who had been much exposed to sun over a long period, recrudescence of dermatitis, produced by giving sulphanilamide, occurred not only at the site of the original lesion but also, to a severe degree, on the exposed parts, although these had not been affected before (figs. 10 and 11). The line of demarcation was extremely sharp, corresponding exactly to the limits of the sun-tanned areas.

For obvious reasons the test dose was kept small. Irritation developed after an interval of 3¼–4 hours following a dose of 1 gramme. Erythema with early vesicle formation was apparent about an hour later, progressing to a definite vesicular eczema which reached its maximum intensity in 12–24 hours. Two patients who received two doses of 1·0 g., with an interval of 4 hours, developed a severe weeping eczema with great œdema of the face.

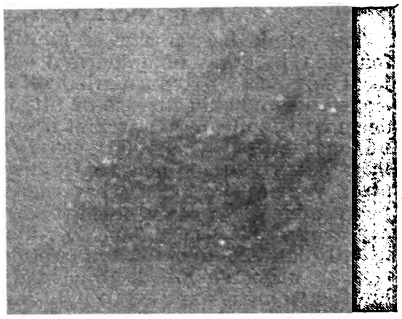

Fig. 5—Patch-test after 20 hours.

GROUP SENSITIVITY

It appears that patients sensitised to one of the sulphonamide drugs are thereafter sensitive to other members of the group.

Sulphapyridine.—Patch-tests and administration of the drugs by mouth showed that patients sensitised to sulphanilamide were likewise sensitive to sulphapyridine and vice versa. Where sulphanilamide was the original cause, this substance usually gave a stronger reaction to the patch-test than sulphapyridine, but there seemed to be no difference between the effects of their oral administration.

Sulphathiazole.—Two patients, sensitised to sulphanilamide, developed complications calling for further administration of the drug, but in view of their known sensitivity it was decided to try sulphathiazole. Both patients reacted with an eczematous dermatitis, the

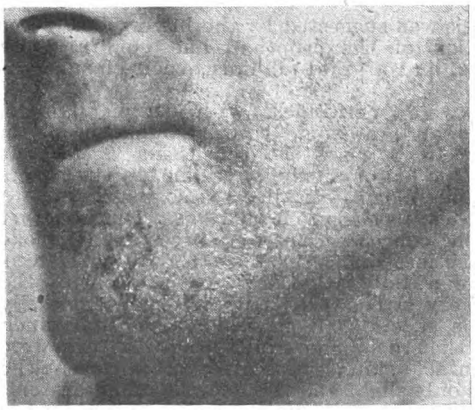

Fig. 7—Recrudescence of secondary eruption after test dose of sulphanilamide: same patient as Fig. 6.

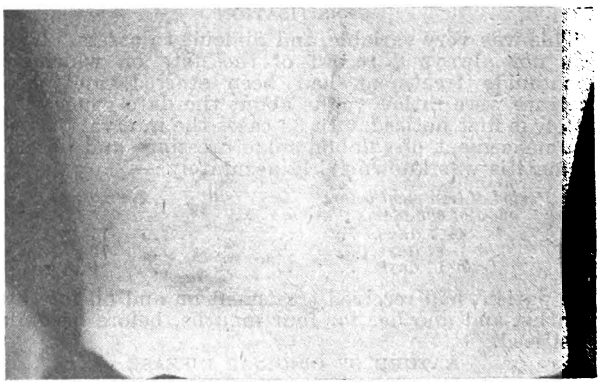

Fig. 8—Recrudescence of eruption in previously unaffected skin after test dose of sulphanilamide.

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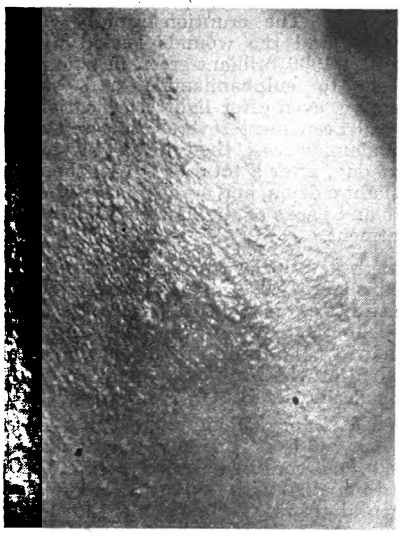

Fig. 6—Recrudescence of original primary eruption after test dose of sulphanilamide by mouth.

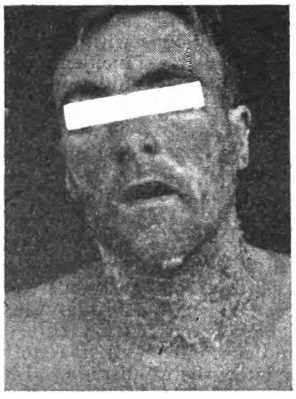

Fig. 10—Effect of previous exposure to sunlight. Photograph shows eruption provoked by test dose of sulphanilamide. Patient had been accustomed to going without shirt. The eruption affected whole of previously exposed skin, though the trunk and arms were actually covered when the test dose was given. These areas had not been involved in the original dermatitis which affected the region of the left ear only.

Fig. 12—Eczematous dermatitis provoked by exposure to sunlight in patient recently recovered from sulphanilamide dermatitis. This original dermatitis had affected only the left side of the face and neck.

latent period being the same as that following sulphanilamide administration. One patient received a total of 8·0 g. and the other 4·0 g. of sulphathiazole, the drug being discontinued because of the severity of the reaction.

Sulphaguanidine.—This was given to 2 patients with positive patch-tests to sulphanilamide and sulphapyridine. Administration was started at 12.00 hours and continued 4-hourly, 3·5 g. being given at 16.00 and 20.00 hours, and again at 06.00 and 10.00 hours next day. Severe eczematous dermatitis appeared, but only after lapses of 17 and 22 hours from the first dose. The slow absorption of the drug probably accounts for the long latent period. Sulphadiazine and other sulphonamides have not yet been tested.

DURATION OF SENSITISATION

Once established, sensitisation is probably permanent. Where there has been opportunity for follow-up, patients have been found still sensitive several months later. In 3 patients recently examined sensitivity had persisted for 18, 15 and 6 months.

APPARENT ALLERGY TO SUNLIGHT FOLLOWING SULPHONAMIDE DERMATITIS

This was observed in 2 cases:

A.B. aged 31. Admitted April 11, 1943. History of "cold sores" on nose a fortnight previously. After application of sulphanilamide powder for a week a rash appeared, at first in the area under treatment, then on the areas normally exposed to light, and later on other parts. On admission he presented a generalised vesicular eczema. Temperature 102° F. Patch-test after subsidence of eruption strongly positive. Exposure to sun on May 2, when all traces of rash had disappeared, provoked an acute vesicular eczema on all the exposed areas with very sharp lines of demarcation. Re-exposure three weeks later produced a less severe recrudescence, but 18 days later still the patient could be exposed to the sun with impunity. Patch-tests with sulphanilamide were still positive.

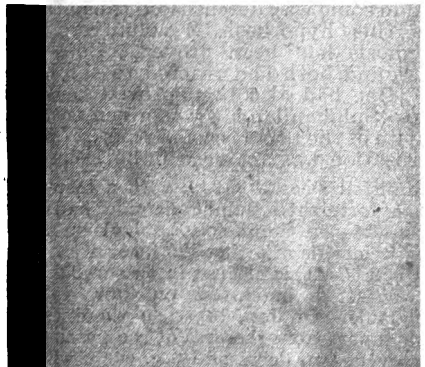

Fig. 9.—Recrudescence of eruption at site of patch-test and in area previously irritated by strapping, after test dose of sulphanilamide: same patient as fig. 1.

C.D. aged 31. Admitted April 1, 1943. History of "sore" on left ear two weeks previously, treated for one week with sulphapyridine paste. On admission he had a severe eczematous dermatitis of the left side of the face and neck only. Sulphonamide sensitisation was diagnosed. Patch-test strongly positive (sulphanilamide). The eruption subsided in one week with Lassar's paste dressings.

Ten days after admission he was exposed to the sun for about an hour. This produced an acute vesicular eczema affecting not only the original area of dermatitis but all the exposed parts (fig. 12). After this eruption had disappeared he was again exposed to sun, with no ill effects. The exposure was increased to about six hours daily, still without any abnormal reaction, and he was discharged on April 28. Patch-test performed before discharge strongly positive.

Two or three days after his discharge he reported sick with a weeping rash on the chin. This was treated with gentian-violet at station sickquarters. Next day the lobes of the ears and both cheeks started to weep and the neck was involved the following day. Sulphanilamide powder was then applied (in error), and next morning the rash on face and neck was much aggravated, and there was a vesicular eczema affecting the hands which were much swollen. All the covered parts remained clear. After his discharge from hospital, patient had been in the sun five or six hours daily. He was again admitted to hospital, and after three weeks, when all trace of dermatitis had disappeared, he was exposed to the sun again, and also to ultraviolet rays from a mercury-vapour lamp, without the slightest ill effect. Five days later a patch-test was performed. This was strongly positive. After

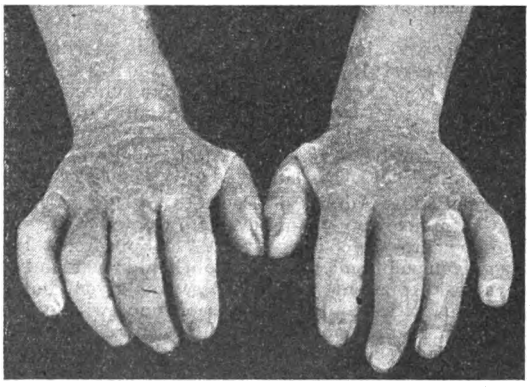

Fig. 11—Hands of same patient. The original dermatitis did not affect the hands.

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exposure to sun the next day, a weeping eczema again broke out on the exposed areas. Desensitisation was then commenced, and when this was complete and the resulting reaction had completely subsided, exposure to sun produced no abnormal effect. After daily exposure for six days the following test was performed:—

11.00 hours 2·0 g. sulphanilamide given.
14.00 hours 1·0 g. sulphanilamide given.
14.00 hours patient went out into sun feeling perfectly well.
14.30 hours œdema of both hands apparent. Exposure to sun discontinued.
15.00 hours rigor lasting half an hour.
18.00 hours weeping dermatitis and œdema of all exposed parts. Temperature 99·5° F.

A patch-test performed next day was completely negative. Seven days later sulphanilamide per os, 1·0 g. t.d.s., produced not the slightest reaction. After 5·0 g. had been given a small area on the neck was exposed to ultraviolet rays from a mercury-vapour lamp for a period which would normally produce a first-degree erythema. Three hours later there was itching, intense erythema, with œdema and oozing over the treated patch only. Infra-red irradiation to another area was without visible effect.

These cases show that sulphanilamide can act as a photo-sensitising agent. It does not produce a permanent allergy to sunlight: the effect disappears in time, probably when all traces of the drug have been excreted. In the second case sensitivity to sunlight recurred twice without any further administration of the drug per os. Each recrudescence, however, followed a patch-test from which a certain amount of sulphanilamide would be absorbed.

This phenomenon is not a mere intensification of allergy to sulphanilamide, as might be argued from the first case. Here it was conceivable that sulphanilamide remained in the tissues but in quantities insufficient to cause dermatitis, and that exposure to sun merely lowered the threshold. That there is a threshold concentration of the drug below which dermatitis in a sensitised subject does not occur was shown by later observations. The second case, however, disproves this supposition. Dermatitis on exposure to sunlight was produced by ingestion of sulphanilamide after the patient had become completely insensitive to the drug itself.

TREATMENT

1. *Local.*—The dermatitis rapidly cleared in most cases with Lassar's paste dressings to the weeping areas and a lead and calamine lotion to dry parts of the rash. (N.B.—Under different climatic conditions somewhat different treatment might be needed—e.g., in England acute weeping eczema usually does best with lotions or paints.)

2. *Desensitisation.*—So far as we have been able to ascertain, sulphonamide sensitisation, once established, is likely to be permanent, following the general rule in epidermal sensitisation. Attempts to desensitise were therefore made by oral administration of very small doses of the drug. At first a daily dose of grain 1/500 was tried. No reaction followed this amount, but when the dose was increased to gr. 1/250 daily the eruption began to break out afresh. This observation is interesting, for it seems to show that for dermatitis to occur, a certain minimum threshold quantity of the drug must reach the skin, even in a highly sensitised subject. No success attended this method, and it was ultimately abandoned.

Chance observation revealed a possible method which has been successful, though it may not be universally applicable. It was very apparent that when sensitised patients were given sulphonamides by mouth, the longer the drug was administered, the worse and more extensive the eruption became. But the behaviour of 3 cases seemed to show that this rule was only partly true:

E.F. aged 29. Admitted Dec. 18, 1942. History of multiple shrapnel wounds on Dec. 10, treated with sulphapyridine powder. Some days later a rash appeared. Patient was then given sulphanilamide by mouth and the rash became much worse. Apparently about 18 g. was given, but dates and exact quantities could not be ascertained with certainty. On admission he presented an acute vesicular eczema round all his wounds, on the face and hands, and a milder patchy eruption on the arms, forearms and inner aspects of thighs. The distribution and history of the eruption, and especially the correspondence of the shape of the eruption round the wounds and the shape of the dressings, at once suggested sulphonamide sensitisation. The eruption rapidly cleared with sedative treatment, and the wounds healed without incident on dressings of 1/1000 brilliant-green in zinc paste. Subsequent patch-tests to sulphanilamide and sulphapyridine were all negative, even after light scarification and on the areas which had been most severely affected round the wounds. Sulphanilamide was then given by mouth, 1·0 g. 4-hourly. Next day, after a total of 4·0 g., there was some erythema with slight œdema, and a fine papulo-vesicular eruption on the wrists and backs of the hands. This rapidly subsided without treatment.

This case remained a puzzle for some time. The original appearances suggested a classical case of sulphonamide sensitisation, but it was difficult to reconcile with this diagnosis the negative patch-tests and very slight reaction to the internal administration of sulphanilamide. Light was shed on the problem, however, by the behaviour of 2 other cases both admitted on Feb. 26, 1943.

G.H., aged 33, gave a history of impetigo of six weeks' duration. On Feb. 12 cod-liver oil and sulphanilamide dressings were started and continued until Feb. 19. On admission he presented impetigo with dermatitis of the beard area and severe submental adenitis. On Feb. 27 the adenitis was somewhat worse, sulphanilamide was prescribed and 1·0 g. was given in the evening. On the 28th there was œdema with a papulo-vesicular eczema of the face, and a less marked erythemato-vesicular rash on the body. A diagnosis of sulphonamide sensitisation was made, but the administration of sulphanilamide was continued in error, 3·0 g. being given during the day, and 1·0 g. the following morning. On March 1 there was a severe generalised weeping eczema, accompanied with intense itching and œdema of the face causing closure of the eyes and great swelling of the lips. There was a slight rigor and the temperature rose to 99·2° F. No more sulphanilamide was given and the eruption cleared on Lassar's paste dressings.

I.J., aged 26, gave a history of impetigo of five weeks' duration. On Feb. 17 sulphanilamide and calamine paste was applied and continued for an unknown period. On admission he had impetigo and dermatitis of the face and ears, with left submaxillary adenitis. Oral sulphanilamide therapy (for the adenitis) was started on Feb. 27. This produced, on the following day, a severe weeping eczema with great œdema of the face, and vesicular eczema of the hands, fingers and forearms. A diagnosis of sulphanilamide sensitisation was made, but the drug was continued, in error, on both Feb. 28 and March 1, 3·0 g. being given each day. On the morning of March 1 the œdema had disappeared and the eczema was no worse. On March 2 urticaria was present, but the eczema seemed rather better. Sulphanilamide was still continued until a total of 22 g. had been given, but the eruption nevertheless improved, and finally disappeared without any special treatment.

When the eruption had faded patch-tests were performed in both cases, with completely negative results. Sulphanilamide was then given by mouth, and this also failed to provoke the least reaction. The behaviour of these cases had been such that we felt unable to entertain the idea of incorrect diagnosis. It seemed much more likely that the severe reaction produced by giving sulphanilamide had in some way desensitised the patients. In order to test this hypothesis 2 volunteers were chosen whose diagnosis had been proved. Both had positive patch-tests, and both had reacted to sulphanilamide by mouth. One had also been proved sensitive to sulphaguanidine. Sulphanilamide was given to each, and continued in spite of the usual eczema reaction which followed. Desensitisation was achieved in both cases:

K.L., aged 22, admitted Dec. 30, 1942, with a history of impetigo for about a fortnight. Sulphanilamide had been applied since the onset. On admission he had an acute weeping eczematous dermatitis affecting the face, neck, ears, scalp, forearms and hands. This cleared in two weeks with Lassar's paste dressings. A patch-test on Jan. 15 was positive to sulphanilamide. On Jan. 16, when there was no trace of skin eruption (apart from the area of the patch-test), sulphanilamide was given, two doses of 1·0 g. each, with an interval of 4 hours between. Itching was experienced 3¼ hours after the first dose, and 5 hours later eczema was apparent on the face, chest and arms. On Jan. 17 there was intense œdema of the face completely closing the eyes,

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and some œdema of the chest and arms. There was a severe weeping eczematous dermatitis of the face, ears, neck, chest, arms, forearms, hands and inner aspects of thighs. Temperature 100° F. When the eruption had disappeared attempts were made to desensitise by giving very small doses of sulphanilamide, and later by non-specific methods; but patch-tests remained strongly positive.

M.N. was admitted on Dec. 28, 1942, with a history of "desert sores" of one month's duration. Sulphanilamide had been applied for almost the whole of this time. On admission he had multiple ecthymatous ulcers on the left shin and right forearm, surrounded by a weeping vesicular eczematous dermatitis (fig. 1). Vesicular eczema was also present on the chin, arms and left forearm. Patch-test strongly positive (sulphanilamide). He was later found to be also sensitive to sulphaguanidine (tested by oral administration).

These were proven cases. Before the attempt to desensitise was made, further patch-tests were done, again with strongly positive results. Sulphanilamide was then given, 1·0 g. three times daily. Both patients reacted with a more or less generalised eczema. The first (K.L.) showed the same intense œdema as he had done with his previous test dose, and his temperature rose to 102° F. In spite of the severe reaction, however, sulphanilamide was continued, a watch being kept on the temperature and leucocyte count. On the third day there was some amelioration in the condition of both patients; K.L.'s temperature was normal and the œdema subsiding. By the fifth day there was no doubt of the improvement which continued steadily until the eighth day when the drug was stopped, each patient having received a total of 22 g. Patch-tests were now completely negative, and when repeated after 3 weeks, and, in the case of M.N., again after 4½ months, still remained negative.

Ten other patients have since been successfully desensitised by this method.

One patient only developed a slight leucopenia during the course. In all the others leucocytosis occurred, rising in one instance to 26,800 white cells per c.mm. with 85% polymorphs. In 5 cases there was a high eosinophilia, possibly the result of reabsorption of exudate from the skin. The degrees of leucocytosis and eosinophilia seem to show some correspondence with the severity of the reaction, but no definite conclusions can be drawn from these few cases.

DISCUSSION

The practical conclusion from these observations is that external application of sulphonamides causes sensitisation in a proportion of cases which is by no means negligible. Further, it is a group sensitisation and may be—indeed usually has been—of such degree as to preclude subsequent administration of these drugs for other illnesses in effective doses. It is true that moderate doses have sometimes produced desensitisation, but the reaction has been so severe that it would be highly dangerous in a patient already seriously ill with some other disease such as pneumonia.

Another important point is that sensitisation resulted from treatment of conditions for which equally efficient, if not better, alternative remedies are available. Local sulphonamide therapy, though perhaps often effective in such conditions, seems to have gained an undue reputation through comparison with inadequate controls. In the treatment of impetigo for instance, Steigman (1942) compared sulphathiazole ointment with ung. hydrarg. ammon. dil., while Cohen (1942) used equal parts of Lassar's paste and ung. hydrarg. ammon. dil. as a control against sulphanilamide paste. The choice of ung. hydrarg. ammon. dil. as a control is unfortunate, for as a routine treatment it has long been discarded by most dermatologists. Moreover, in some of his cases Cohen found it necessary to resort to other measures to complete the cure. The use of local sulphonamide therapy in such conditions, therefore, seems quite unjustifiable. Major wounds and serious burns are in an entirely different category: the patient's life is endangered, and the remote risk of producing sensitisation must not outweigh the immediate risks of death or deformity.

It may be objected that these patients had an idiosyncrasy and would in any case have reacted to sulphonamides, whether applied locally or ingested. This objection is overruled by the fact that dermatitis did not follow the first application; as in many other examples of epidermal sensitisation, repeated contact was necessary. Further, in some thousands of other cases in which we have given these drugs by mouth, no instance of eczematous dermatitis has been seen. Doubtless constitutional factors render some persons more liable than others to become sensitised. Such variations in susceptibility are well known in contact dermatitis. Thus Cranston Low (1924) was able to sensitise only a certain proportion of apparently normal persons to primula. This predisposition, however, is only relative, for Bloch (1928), using a concentrated ethereal extract, produced sensitisation to primula in 100% of cases. Among our patients some became sensitised after a few days, others only after many weeks. But this variation cannot be attributed solely to constitutional predisposition. Many other factors play a part in producing sensitisation—concentration of the drug, climatic influences, maceration of the horny layer of the skin, local trauma, and so on.

There appears to be a twofold relationship between sunlight and sulphonamide dermatitis. Epstein (1939) and Blum (1941) showed that intradermal injection of sulphanilamide produced a local intensification of the normal reaction of the skin to light from a mercury-vapour lamp. Park and Platts (1942) described cases of other sulphonamide eruptions on parts normally exposed to sunlight, though not necessarily exposed at the time of the eruption, a phenomenon which we also have often encountered.

In 4 cases of the present series, the "secondary" eruption was strictly confined to the areas normally exposed to light. In 2 other patients, who had been much in the sun over a long period, ingestion of sulphanilamide caused a recrudescence of dermatitis in all the areas which had been exposed but which had not been involved in the original dermatitis and which were actually covered when the drug was given. It seems therefore that long-continued exposure to sunlight facilitates the production, or at any rate the spread, of sensitisation. A similar mechanism probably underlies the distribution of the rashes observed by Park and Platts. As already mentioned the reverse phenomenon sometimes occurs, sulphanilamide causing sensitisation to sunlight. The case of C.D. provided the crucial test of this. Here, after desensitisation, the patient could tolerate long exposure to sunlight and also large doses of sulphanilamide *after* exposure. Dermatitis was produced only by actual irradiation after ingestion of the drug, to which the patient was now insensitive.

It is conceivable that constant and relatively intense sunshine accounts in part for the large number of cases of sulphonamide dermatitis seen in the Middle East. But it must be noted that as a rule sensitisation developed first in skin covered by dressings and often in areas normally shielded from the sun by clothing. Moreover, there has been no obvious seasonal incidence and several patients had not been particularly exposed to sun.

Desensitisation presents several points of interest. It seems to depend not on the severity of the reaction produced but on the quantity of the drug given. Symptoms from test doses of sulphanilamide have been just as severe as those seen afterwards during the process of desensitisation. This follows logically if it be assumed that the symptoms result from an antigen-antibody reaction: desensitisation is presumably brought about by using up the available antibodies. The dosage required varies from case to case, probably with the degree of sensitisation (quantity of antibodies present). Thus one patient showed a negative patch-test after 10 g. of sulphanilamide, while another was still sensitive after 22 g., complete desensitisation being achieved only by a second course of the drug. It is conceivable that our earlier experiments with small doses would have been successful if the drug had been continued longer; this possibility is being re-explored.

It is not yet known whether desensitisation is permanent or the method universally applicable. One patient still remains desensitised after 4½ months, and others are being followed up. Some of the reactions during desensitisation were extremely severe, and the method may not be altogether free from danger. It is best to avoid the necessity for it, so far as possible, by

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reserving local sulphonamide treatment for cases where withholding it might endanger life or lead to deformity.

SUMMARY AND CONCLUSIONS

1. Epidermal sensitisation to sulphonamides, with eczema reaction, has been produced by local application of the drugs.
2. It is a group sensitisation.
3. It may be so intense as to preclude subsequent administration of these drugs in effective doses for other diseases.
4. Exposure to sun facilitates the development of sensitisation; and sulphonamides themselves can cause sensitisation to sunlight.
5. Desensitisation has been achieved, but whether this will be permanent or the method universally applicable is not yet known.
6. Topical sulphonamide therapy for skin diseases and minor injuries is unjustifiable and should be discontinued. It should be reserved strictly for cases where withholding it might endanger life or lead to deformity.

We are indebted to Major H. A. Mavor, RAMC, pathologist, for the blood counts, and to the nursing staff of the hospital, especially Pte. G. E. Smith, RAMC, for their help and coöperation in carrying out the other investigations.

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GUNSHOT WOUNDS OF THE FRONTO-ORBITAL REGION

JOSEPH SCHORSTEIN, F R C S

MAJOR RAMC; OFFICER IN CHARGE OF A MOBILE NEUROSURGICAL UNIT; CHIEF ASSISTANT, NEUROSURGICAL DEPT, MANCHESTER ROYAL INFIRMARY

IN a previous communication [1] I have described my experiences in the treatment of compound skull fractures involving paranasal sinuses. Since then I have treated 10 cases of gunshot wounds involving the fronto-orbital region with tears of the dura, brain damage, and a communication between the intracranial subarachnoid space and the upper respiratory tract. In these battle casualties skin closure was very difficult, particularly when, as in 4 patients, the missile had entered or left the skull through the orbit.

Careful skin closure in two layers is of paramount importance for all penetrating head injuries, but in some cases of the present series we found that packing with soft-paraffin gauze after a careful debridement of brain and bone was a safe alternative. I operated in 8 of the 10 cases summarised in the table: 3 were treated by primary skin closure and the dural defect was covered by a fascia-lata graft. One of the 3 patients died some hours after operation, another was reported to be well a month after operation, and the third returned to duty four months after he had been operated on. Of the 4 wounds which were packed without dural closure 3 are known to have healed by granulation; the 4th patient could not be traced and his fate from a week after operation is not known.

Two patients came under my care two and three weeks after they had been injured and operated on elsewhere. Both had large cerebral fungi and both died.

EIGHT CASE-RECORDS

THREE CASES TREATED BY PRIMARY CLOSURE

CASE 1.—This man was admitted to the neurosurgical unit 30 hours after wounding. He was in good general condition and had no neurological abnormality. Blood oozed from the left nostril. A 2½ in. wound extended laterally from the midline to the left, about 2 in. above the glabella; left eyelids discoloured and swollen. X rays showed many bone fragments driven into the left frontal lobe and a metallic foreign body in the broken roof of the left orbit. Radiating fractures extended into the frontal sinus which was unusually well developed.

Under local and continuous 'Pentothal' anæsthesia a left-sided Trotter skin-and-bone flap was reflected. The sagittal sinus was found to have been lacerated by the injury; bleeding was controlled by a muscle graft. Most of the left frontal pole had been damaged and had to be removed; the roof of the left orbit was fragmented. The metallic foreign body lay in the upper portion of the orbit: it was removed under direct vision. The walls of the left frontal sinus, both in its vertical and horizontal portion, were comminuted. All loose bone fragments were removed, the mucous membrane of the frontal sinus was scraped away and the dural tears, corresponding to entry and exit of the missile, were covered with fascia lata which was sutured in place. Next, the entry wound was excised and sutured in two layers. Sulphanilamide powder was dusted into all parts of the wound. Incision closed in two layers.

The operation had taken 4½ hours. Towards the end the patient's breathing became laboured and his blood dark; pulse fast and irregular. Dyspnœa was even more severe after the operation; the respiratory rate rose to 36 per min. He was given oxygen through a BLB mask, the trachea was aspirated and an endotracheal tube introduced. Twelve hours after operation he died. At necropsy both lungs were found in complete collapse, but there was no obstruction of the air-passages. The area of operation was free from clot and there was no damage to other parts of the brain.

CASE 2.—An Italian soldier, who came under our care 8 days after he had been wounded by a shell splinter. A stellate laceration in the centre of the forehead had been excised at another hospital and the wound had been closed and drained. For 4 days after this operation he had been febrile, drowsy and had had neck rigidity, but later he was thought to be improving. When we first saw him he had cerebrospinal fluid running from the right nostril, his neck was stiff and he had bilateral early papillœdema. Because of language difficulties his mental state was not easy to assess, but as far as one could judge by gesture conversation he had no gross mental defect. He was not incontinent. There was a right-sided ptosis and complete external and internal ophthalmoplegia. The vision in the right eye was reduced, but owing to his lack of coöperation it could not be accurately determined. The left plantar response was extensor. X rays revealed that the entry wound involved the highest part of the frontal sinus in the midline and a foreign body lay in the opaque right maxillary antrum. The missile had apparently traversed the right orbit. In the right frontal region there was also an aerocele, 1½ in. long.

He was given an intensive course of sulphathiazole for 48 hours (28 g. in all) and was then operated on. Under local anæsthesia and endotracheal gas, oxygen and chloroform, a bifrontal skin flap was reflected. A right frontal bone flap was cut across the midline and elevated. Immediately there was brisk bleeding from the lacerated longitudinal sinus. The bleeding was controlled by a muscle graft. Diffluent, apparently infected, brain debris extruded through the dural tear. A second dural laceration was found corresponding to the point of exit of the missile in the anterior fossa. The two dural openings were joined and the brain cavity debrided by suction. The medial two-thirds of the frontal pole was removed. The bony roof of the orbit was found to be shattered and the horizontal portion of the frontal sinus laid open. All loose bone fragments were removed, and the frontal sinus and lateral ethmoidal cells stripped of their mucous lining. The dural opening was partially closed with interrupted silk sutures and a fascial graft was stitched in place over the convexity and tucked in between dura and bone at the base where the dural tear extended too far back to allow sutures to be inserted behind it. The entry wound was excised again and sutured, the bone flap replaced and the incision closed without drainage. Sulphanilamide powder was sprinkled into all parts of the wound.

While under our care the patient made a rapid and afebrile recovery. The CSF rhinorrhœa did not recur and there were no further signs of meningitis. Two months after the operation he was reported to be well; the wounds had healed by first intention.

CASE 3.—An officer wounded by a rifle bullet was admitted to hospital next day. He was then drowsy, but gave an accurate account of the circumstances in which he was injured and coöperated well in all tests. His general condi-

1. Schorstein, J. *Brit. J. Surg.* 1943. In the press.

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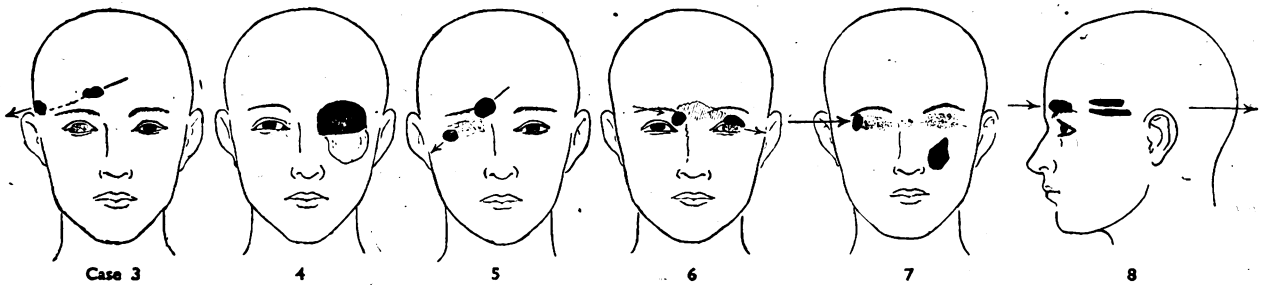
FIGURES ILLUSTRATING CASE-HISTORIES



Case 3 4 5 6 7 8

tion was good and apart from blindness of the right eye there was no neurological abnormality. In the middle of the forehead there was a ragged entry wound and the right temporal region was occupied by a larger exit wound (see figure). X rays showed that the frontal sinus had been penetrated. Fracture lines radiated into both halves of the frontal bone, more on the right than on the left.

Under endotracheal gas-and-oxygen and local anæsthesia a bifrontal skin flap was reflected. The fragments of the frontal bone still had periosteal attachment and a right-sided frontal bone flap was cut across the midline and hinged back on the temporal muscle. During this procedure there was considerable hæmorrhage from the lacerated longitudinal sinus and arachnoid granulations, but once the flap had been reflected the bleeding was easily controlled. The missile had apparently travelled along the roof of the orbit which was shattered and the orbital portion of the frontal lobe was severely lacerated. Bone fragments and pulped brain were removed, the frontal sinus cleaned of mucosa and brain debris, and all necrotic tissue excised from the orbit. The two dural defects—over the frontal pole and on the orbital surface—could not be closed with sutures. The tears were covered by a graft of fascia lata, 2½ by 3 in., which was secured in place by sutures. The temporal dural defect corresponding to the exit wound was left open. Skin lacerations were excised and sutured, sulphanilamide powder was introduced and the bone and skin flaps replaced. Tarsorrhaphy of the blind right eye was done because the excision and closure of the forehead laceration had elevated the upper eyelid. The operation took 5 hours.

For 2 days the patient remained drowsy, but was never incontinent and he could be roused to take drinks. Later he was somewhat apathetic and inclined to be childish, complaining that he was being "bullied." His general condition was good. The unit had to change its location 4 days after this operation and his further progress could not be observed.

He was admitted to a military hospital for head injuries in the United Kingdom 4 weeks later. His wounds were soundly healed, but there was a disfiguring recession of the right supraorbital ridge. Speech and intellectual functions were normal. Smell perception was retained, but probably diminished at each nostril. Vision in the right eye was limited to objects in the temporal field, peripheral to the blind spot; in the left eye acuity and field were normal. Squadron-Leader W. Cashell reported on the right fundus oculi: "Dense mass of vitreous opacities and a defective reflex in all parts except the extreme periphery; there is probably a detachment of the retina here, associated with the vitreous hæmorrhage." External ocular movements were full.

Two months after the wounding Major C. A. Calvert repaired the skull defect with a rib graft. One bone fragment over the upper part of the right frontal sinus appeared dead and was removed. Between it and the dura was a cystic collection of clear watery fluid, sterile on culture. The exposed dura appeared everywhere intact. The patient returned to duty 4 months after his injury.

FOUR CASES TREATED BY PACKING THE BRAIN CAVITY

CASE 4.—This soldier was admitted 2 or 3 days after he had been wounded by a shell-splinter. He was drowsy, could only be roused with difficulty and did not answer questions. The bandage covering his head and left eye was soaking wet from what was thought to be CSF. The only abnormal neurological sign was a slight right lower facial weakness. The injury had turned down a ragged flap of skin (see figure). Its upper margin began halfway down the left side of the nose, continued above the left eyebrow, and, curving downwards and outwards, ended at the base of the left external angular process. The flap hung down over the left cheek, the contents of the left orbit had been disintegrated and there was a steady ooze of CSF from the left orbit in which brain debris was mingled with shreds of orbital contents.

Under endotracheal gas and oxygen anæsthesia, supplemented with pentothal, the orbit was debrided and the remnants of the eye removed. The stump of the optic nerve was identified. Bone fragments from the broken roof and floor of the orbit were taken away and part of the supra-orbital ridge was also removed. Next the brain debris was sucked away, leaving in the left frontral lobe a clean cavity 3 in. deep which measured 4 in. from side to side and 1 in. vertically. The ventricle was not opened. The left frontal sinus had been involved in the injury; it was widely opened and its mucous lining removed. The sinus septum was also found to have been fractured. The brain and bony cavities were powdered with sulphanilamide and two soft-paraffin gauze packs were introduced, one into the brain where it was made to fit snugly into all parts of the cavity, the other into the frontal sinus and orbit. The skin flap was as accurately as possible sutured in place with subcutaneous sutures only, leaving an opening about 1½ in. wide to allow changing of the packs. The operation had taken 80 minutes.

SUMMARY OF CASES

Case	Direction of missile	Interval between wounding and operation (hours)	Type of operation	Result
1	L. fronto-orbital	36	Fascial graft	Died
2	Midfrontal, R. maxillary	240	Ditto	Healed
3	R. fronto-temporal	24	Ditto	Healed
4	L. fronto-orbital	over 48	Soft-paraffin pack	Healed
5	R. fronto-orbital	24	Ditto	Healed
6	R. naso-L. orbital	over 24	Ditto	Healed
7	R. orbit-L. maxillary	over 24	Ditto	Not known
8	L. fronto-temporal	over 24	Dura closed Soft-paraffin pack	Healed
9	L. fronto-orbital	24	Superficial* debridement	Died
10	L. fronto-R. orbital	24	Ditto*	Died

* Operated on elsewhere.

After the operation there was no further leak of CSF and the packs were changed on the third day. After that the patient passed from under our care. Three months later he was reported to be in the United Kingdom. He had had a plastic operation on the left eyebrow and had made a good recovery from this, but one week later he had had an epileptic fit.

CASE 5.—A fragment of an artillery shell had caused this man's injury and I saw him less than 24 hours later. The entry wound occupied the medial two-thirds of the right supraorbital region and the missile had left the skull through the right orbit and palpebral fissure lacerating the eyelids in its passage (see figure). The patient's general condition was satisfactory and he had no abnormal neurological signs.

He was operated on under endotracheal gas-and-oxygen and intravenous pentothal. It was found that the injury had comminuted the walls of both frontal sinuses and the roofs of both orbits, and fractures extended into the right ethmoidal cells. The falx had been torn across near its insertion into the

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crista galli. Debridement of the pulped brain left in the right frontal lobe a cavity about the size of a tangerine and a smaller cavity in the left frontal lobe. Bone fragments were removed from the right and left anterior fossa so that the lower two-thirds of both frontal sinuses, both orbits and the right ethmoidal cells were widely opened. The torn right eyeball was removed, the orbit debrided and hæmostasis secured. The mucosal lining of the air sinuses was twisted out. After the introduction of sulphanilamide powder the brain cavities and sinuses were packed with separate strips of soft-paraffin gauze, and the wound edges partially closed with subcutaneous sutures. Until the second day there was a slight flow of CSF, present also before operation. On the 7th postoperative day the packs were changed and the cavities were found to be clean. Six weeks later I saw him in a base hospital. The wound had cleanly healed; he was up and about and made no complaints.

CASE 6.—The missile, probably a mortar fragment, had entered to the right of the bridge of the nose, traversed the uppermost portion of the nasal cavity and had left the skull through the left external angular process (see figure). When first seen 24 hours after the injury he was difficult to rouse and his right limbs were weaker than the left though he could move them voluntarily.

At operation, under endotracheal gas-and-oxygen, the contents of the left orbit were found to have been disintegrated, the roof of the orbit was fragmented and bone splinters had been driven up through the dura into the frontal lobe. The frontal sinus had been widely opened. The left eye was enucleated, the orbit and brain cavity debrided and the frontal sinus stripped of its mucous lining. Sulphanilamide powder was introduced and one soft-paraffin gauze pack was left in the brain cavity, another in the frontal sinus. The lacerated eyelids and other skin wounds were partly closed. The operation had taken just over an hour. On the 3rd day the wound was inspected and on the 6th day the packs were changed. The cavities were clean and dry.

About 6 weeks later he was seen at a base hospital. The wounds had healed, but he had had 2 waves of meningitis controlled by chemotherapy. His general and mental states were much improved, but the right hemiparesis persisted.

CASE 7.—This soldier was admitted from the field 24 hours after injury. He was confused, but had no other neurological abnormality. X rays showed that the left maxillary antrum was almost completely occupied by a metallic foreign body; both external angular processes and the roofs of both orbits were fractured (see figure). At operation it appeared that the missile had passed through the lateral wall of the right orbit and had traversed the right and left orbits fracturing their bony walls. It then struck the left external angular process and fell into the maxillary antrum.

The disintegrated eyeballs were excised, loose bone fragments removed and the orbital aspects of both frontal lobes cleaned by suction. The resulting brain cavities were shallow, but they extended over the whole of the orbital surfaces. The shattered walls of the ethmoid sinuses and of the frontal sinus were removed and their mucosa stripped off. The missile, a piece of metal 2 in. by 2 in. was lifted out of the left maxillary antrum. Sulphanilamide powder was introduced and the brain cavities were packed with soft-paraffin gauze. The patient had to be evacuated on the second postoperative day and it has not been possible to trace his fate.

ONE CASE TREATED BY DURAL CLOSURE AND EXTRADURAL PACK

CASE 8.—This man was admitted under the care of the neurosurgical unit less than 24 hours after wounding. He was mentally alert and had no neurological disability, and his general condition was good. There was a wound of entry above the medial third of the left supraorbital ridge and two large lacerations in the left temporal region (see figure). These were separated from each other by a narrow bridge of skin; their long axes were directed from before backward. The missile had entered through the left frontal sinus, made its way across the left external angular process and left the skull through the temple. One of the two temporal skin lacerations had been produced by a piece of bone which was tilted outward. The bone injury was a "gutter fracture" and the missile had, as it were, cut across the corner from forehead to temple.

After the depressed bone had been removed a dural tear 1½ in. long was exposed, and pulped brain extruded through this opening. The damaged brain was sucked away, hæmostasis was secured and the dural tear (1 in. by ½ in.) closed with interrupted sutures. The frontal and temporal wounds had been excised previously; their complete closure was thought inadvisable for it would have required the cutting of skin flaps and might have produced facial distortion. They were partially closed and the remainder packed with soft-paraffin gauze over sulphanilamide powder. The pack was removed 12 days after operation. Thereafter there was superficial infection, with moderate purulent discharge from the wound, but a report from a base hospital 3 weeks after the operation said that he was making a good recovery. He was admitted to a military hospital for head injuries in the United Kingdom 5 weeks after wounding. He then had amnesia for the period of injury and the ensuing 48 hours; psychometric tests showed evidence of intellectual loss. His wound was healed, except for an area of healthy granulations at the posterior end which soon healed. Smell, visual acuity and fields, pupils, and external ocular movements were normal. There was moderate trismus, probably due to damage of the left temporal muscle. Cisternal encephalography showed slight dilatation and wandering to the left of the left anterior horn. The CSF was normal. He was discharged from the Army.

DISCUSSION OF CASES 1–8

The operations in these cases followed the leading principle of modern war surgery—removal of all material which is either already infected or likely to become so. In the fronto-orbital region the application of this principle requires a thorough exploration of the nooks and crannies of the paranasal sinuses. Not uncommonly they will be found to contain pulped brain and bone splinters, surely potent causes of late infection. In these war wounds, as well as in the civilian injuries of the fronto-orbital region, it has been my routine to lay open those sinuses whose walls have been damaged and to remove their mucous membranes in an attempt to ensure that all infected material has been taken away. When the wound has been debrided one is left with a brain cavity which communicates with the outside through the original wound or wounds and with the upper respiratory tract through the paranasal sinuses. Both these communications must be sealed and this object is ideally achieved by grafting the dural tears and closing the skin wounds. In this respect the treatment of penetrating brain wounds differs from that of wounds elsewhere in the body.

Why sepsis so seldom follows primary skin closure in head wounds is not entirely clear: several factors may play their part. For one thing, the damage to the brain is often caused by indriven bone fragments which are not infected, while the missile may remain in the superficial parts of the wound. Large traumatic cavities, with tracks branching off in all directions, such as are met with in limb wounds, are not seen in surviving casualties with penetrating head injuries, and in the brain it is possible to leave a smooth clean cavity at the end of an operation. The scalp can be widely excised and the clean wound edges will nearly always heal by first intention. It was with a good deal of misgiving that we placed a soft-paraffin gauze pack into a brain wound for the first time and only dire necessity—the patent futility of attempting a satisfactory skin closure—forced us to do so. The dangers of cerebral herniation and subarachnoid infection were in our minds, and as the unit was working in forward hospitals cases could not be retained long enough to ensure that these dangers were past. With our present experience, however, it seems that radical debridement allows these wounds to be packed.

The grafting operation is in my opinion the procedure of choice in these cases, for it is followed by rapid local healing and a shorter period in hospital. It cannot be performed when the main wound cavity communicates with the outside through the orbit. A weighty argument against the grafting operation is that it takes 4–5 hours—a considerable portion of the surgeon's working day. Also patients whose general condition is not entirely satisfactory will not stand such long operations.

If soft-paraffin gauze is used the pack should be made to fit into all parts of the cavity so that no dead spaces are left, and we have found it useful to use separate packs for the brain and sinuses. The dressings have been kept in place with plaster-of-paris skull-caps—the routine dressing for all penetrating head injuries. In

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this manner the wound can be hermetically sealed off, restless patients are prevented from disturbing the dressing and the mechanical support given by the plaster may prevent cerebral herniation.

The one death in the above series was due to pulmonary collapse, and although neither blood nor mucus was formed in the air-passages at necropsy there may have been an obstruction through blood trickling down from the field of operation. It has been the routine since then to introduce an endotracheal tube and to pack the pharynx in all cases with wounds involving the paranasal sinuses.[2]

TWO CASES OF FRONTO-ORBITAL INJURY WITH CEREBRAL FUNGI

Two cases belonging to the group under discussion had had their primary operative treatment elsewhere and came under the care of the unit some weeks later.

CASE 9.—This man was admitted 16 days after he had been injured by a mortar fragment. The entry wound was in the left frontal region near the midline and a foreign body lay embedded in the floor of the left anterior fossa. The wound had been superficially debrided within 24 hours of the injury and left open. When seen by us a cerebral fungus the size of a tangerine protruded through the wound. He was doubly incontinent, difficult to rouse and had meningeal irritation. Attempts to reduce the fungus by lumbar punctures failed. On the third day his condition deteriorated and ventriculography was performed to show the extent of the abscess. He died a few hours later. At necropsy a large cavity containing pus and brain debris occupied portions of both frontal lobes. Pus extended into the shattered ethmoidal cells and the frontal air sinus. An area of diffluent encephalitis surrounded the abscess cavity which had only a thin wall.

CASE 10.—Three weeks after wounding this soldier came under the care of the neurosurgical unit. The brain injury had been operated on by a forward surgical unit less than 24 hours after he had been injured. When seen by us he had a large left frontal cerebral fungus, and right hemiplegia, and was difficult to rouse. He was doubly incontinent, had pressure sores at the back of his head and musculospiral palsy on the left, due probably to pressure from the stretcher bars. The left eye was blind and proptosed. The right eyelids were œdematous and there was a fluctuating swelling in the right upper eyelid. X rays again showed that the floor of the anterior fossa had been fragmented and a missile lay in the left orbit. He died on the sixth day after admission. The necropsy findings were almost identical with those of case 9. The swelling in the right upper eyelid was due to pus tracking through the ethmoidal cells into the orbit.

In these 2 patients the primary treatment had been incomplete and ineffective. In one the wound had been left open and in the other the wound had been sutured in one layer. The paranasal sinuses had not been inspected and had not been cleaned. By the time these patients reached the head centre their condition was hopeless. These 2 cases occurred at the beginning of the campaign and possibly we were at fault for not attempting a radical operation even at such a late date. The extensive sepsis found at autopsy makes it seem unlikely that an operation could have then been successful.

COMMENT

The group of cases described in this communication constitutes 4% of our total of penetrating head injuries. These patients have this in their favour—that only rarely does the injury trespass beyond silent brain areas, so that their return to a full life depends chiefly on the healing of the wound. Many of them have the handicap that they have lost one eye, and one patient had lost both; but hemiplegias are rare and gross mental changes were not observed.

A detailed knowledge of the anatomy of the injured region is essential in the treatment of these cases and good X-ray films should be available to show the extent of the damage to the anterior fossa and paranasal sinuses. The whole armamentarium of neurosurgery must be at hand, particularly suction, diathermy and a focusing headlamp or illuminated retractors. No amount of skill and ability can take the place of these requisites.

2. The anæsthetics for these operations were given by Lieutenant T. C. Gray, RAMC.

SUMMARY

Ten cases of fronto-orbital injury are described. Eight were operated on by the author with one death; one patient has not been traced beyond the second post-operative day.

The operative procedures and the anatomy of the injuries are described.

Two cases had been operated on elsewhere; both died.

My thanks are due to Brigadier Hugh Cairns for his kind help in the preparation of this paper.

TENDER MUSCLES IN SCIATICA

ELECTROMYOGRAPHIC STUDIES

FRANK A. ELLIOTT, M B CAPE TOWN, M R C P
MAJOR RAMC; MEDICAL SPECIALIST

THE purpose of this article is to record some observations on the tender spots, sometimes described as nodules, found in the muscles of the buttock and calf in certain cases of sciatica. They commonly occur in muscles with an extensor function, are sharply localised, and, when palpated, give rise to pain which may radiate down the limb. Both the local tenderness and the sciatica itself can in some cases be abolished by injecting procaine into the tender spots, whereas the injection of a similar amount elsewhere is without effect—i.e., the action is local. It is not surprising therefore that contemporary writers have fostered the belief that these tender spots are the site of an inflammatory or rheumatic process which gives rise to referred sciatic pain, and that the successful exhibition of procaine confirms the diagnosis and by inference excludes other causes. It is not generally recognised that tender spots indistinguishable from the more benign forms of myalgia both in their clinical features and in their response to procaine may be found in the muscles supplied by an irritated nerve-root. This is most commonly met with in sciatica due to prolapse of the nucleus pulposus, but also occurs in spinal tumours. Two examples may profitably be quoted.

CASE 1.—A man of 22 years had severe sciatic pain in the right leg. Neurological examination was negative and the spinal fluid normal. He had a tender spot in the right gluteus medius, which when pressed upon produced an exacerbation of the sciatic pain. He was completely relieved of all discomfort by the injection of 5 c.cm. of procaine into the tender area. Pain returned 3 weeks later, and when seen 2 months after the injection he presented the signs of a prolapsed disc, subsequently confirmed at operation.

CASE 2.—A boy of 19 years suffered from pain in the left side of the neck and down the outer side of the arm to just below the elbow. The trapezius and the subjacent muscles of the neck were very tender. A complete investigation having failed to show anything serious in the spine and nervous system, the tender areas were thoroughly infiltrated with 70 c.cm. of 0·5% procaine, with complete relief. Slight pain recurred after a week but he was able to continue at his work for 5 months, when weakness of the shoulder girdle brought him to seek advice. He now presented signs of a lesion of the third cervical root, and an extradural myxoma was found at operation.

Although such cases form but a small percentage of the myalgias, they are important in that the causative lesion is known and provides a basis for discussion and investigation. Since the tender spots are confined to the muscles innervated by the affected root, and disappear when the source of irritation is removed by operation, an inflammatory origin can be excluded. It is therefore necessary to consider whether the muscle tenderness is a referred phenomenon, dependent on an excitable condition in the spinal cord and unassociated with changes in the muscles concerned, or whether it is due to changes brought about in the muscle by irritation of the nerve-root. The migratory character of the tender spots directs attention to muscle spasm as a possible cause of the tenderness and pain in these cases. There is little doubt that localised spasm of a portion of a muscle can occur. I have seen it, for instance, as a visible and palpable swelling the size of a broad bean in the upper free edge of the trapezius in a girl suffering from pain in the shoulder and arm. When it had been present for some weeks, exploration was decided on, but the lump disappeared under a general anæsthetic and a

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long search through a wide incision failed to disclose any cause for it. The procedure cured the pain and the patient has remained free from symptoms for 2 years. Whatever the cause of the condition, the evidence of spasm appeared incontrovertible.

The demonstration of nodules is rarely so convincing, and some other method had to be found. Use was made of the fact that contracting muscle gives rise to action potentials which can be recorded. The investigation was made possible by the coöperation of Captain Graham Weddell, RAMC, and Dr. B. Feinstein, who have evolved an electromyograph suitable for clinical use.[1] The electrodes are threaded through a hypodermic needle so that their tips lie in the bevel of the needle. They are led off through a high-gain amplifier to a cathode ray oscilloscope with a loudspeaker attachment, so providing visual and auditory patterns of muscle activity. With the amplifications used, resting muscle shows no activity, whereas contraction is accompanied by characteristic action potentials.

RESULTS

The clinical material, listed in the table, consisted of 14 cases of sciatica in which a prolapsed disc was found at operation. In 8 cases there was well-marked local tenderness and in 6 controls there was none (severe degrees of tenderness are in fact uncommon except in acute cases; no inferences should therefore be drawn from these figures).

The insertion of the needle electrode into normal muscle evoked a momentary contraction of a few fibres; this will be referred to as normal irritability. In the case of tender muscles this initial contraction affects more fibres and may be sustained for a second or two—i.e., the irritability is increased, and deep palpation of the surrounding muscle gives rise to fresh bursts of motor activity. The increase is limited to the tender areas of muscle, and has been found in almost every case of deep tenderness. Exceptions to this will be described below.

FINDINGS IN 14 CASES OF SCIATICA WITH PROLAPSED INTERVERTEBRAL DISC

Case	Disc	Site of tenderness	Findings
1	L4	Glut. max. near sacrum	Increased irritability; continuous discharge
2	L4	Glut. medius and calf	
3	L5	Lat. aspect of calf	
4	L4	Lat. aspect of calf	
5	L4	Glut. medius	
6	L5	Deep head of biceps femoris	
7	L4	Buttock and calf (? soleus)	
8	L4	Glut. med. and calf	
9–14	..	None	No increase of irritability

In addition to this hyper-irritability, some cases have shown a continuous discharge of action potentials in muscles which are otherwise relaxed. The rate of discharge has varied from 8 to 12 per second, and the complexes (fig. 1, *b*) bear a general resemblance to those of voluntary contraction (fig. 1, *c*) but are quite distinct from the fibrillation of denervated muscle (fig. 1, *d*). One or more motor units may appear on the record, some representing fibres in contact with the electrodes, some more distant. This repetitive discharge was at first regarded as the response of irritable muscle to the continued presence of the needle, but further observations have suggested that it may represent true involuntary spasm. Moving the point of the needle in such a way as to stretch the fibres does not increase the frequency of the discharge. Moreover, if the needle be allowed to rest, without movement, spontaneous fluctuations in the intensity of the motor activity may be observed; nearby units may cease abruptly while more distant ones continue. This differs from the outbursts of increased irritability in that palpation of the surrounding muscle does not increase the frequency of the discharge. It is not abolished by voluntary contraction of the antagonists of the muscle concerned.

There appear grounds, therefore, for considering that in addition to the reaction of an irritable muscle to the presence of a needle there is in some cases spontaneous motor activity within the areas of tenderness.

It is clearly of crucial importance to establish that this motor activity occurs within the substance of muscles

1. Weddell, G., Feinstein, B. and Pattle, R. E. *Lancet*, 1943, i, 236.

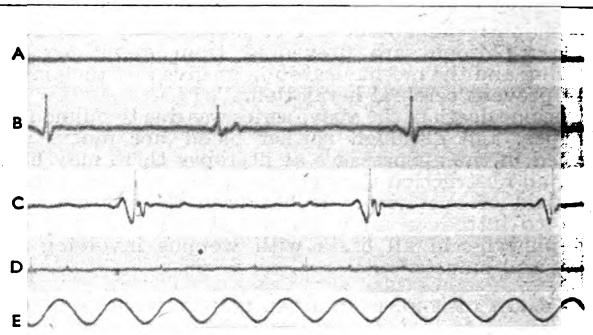

Fig. 1—Oscilloscope. A, normal resting muscle. B, involuntary 8 per sec. discharge from tender spot in soleus. C, minimal voluntary contraction of normal soleus. D, fibrillation in denervated muscle. E, calibration 50 microvolts, 50 cycles per sec. AC.

which are otherwise at rest. Direct observation is not enough. Simultaneous recordings from tender and non-tender portions of the same muscle are necessary and since these could not be obtained with the oscilloscope in question, Captain B. K. Wilson has used a multichannel inkwriting system for the purpose. The inertia of the machine and the slowness of the recording strip make it impossible to observe wave form, but it can be used to compare the relative activity of two areas. Fig. 2 shows simultaneous recordings, (*x*) from a non-tender spot in the gastrocnemius of a man with sciatica and (*y*) from a tender spot 4 cm. away in the same muscle.

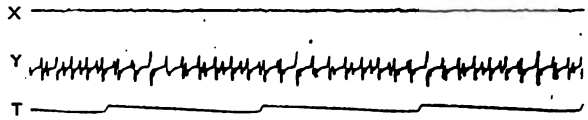

Fig. 2—Oscillograph. Simultaneous tracings, X from a non-tender spot in gluteus maximus, Y from a tender spot 4 cm. distant in the same muscle; T, time in seconds.

Repeated observations on a number of cases have substantiated these results.

Deep tenderness has been found without increased irritability in two cases of radicular sciatica; the myogram needle evoked pain, but the muscle did not give its customary twitch. It is possible that this form of tenderness is a true referred phenomenon, such as is met with along the sciatic nerve, but this does not explain its subnormal irritability. Long-continued spasm may give place to fatigue and a reduction of irritability in the muscle concerned. This was suggested by a case in which the tender gluteus medius showed no motor activity at the points investigated, but when the test was repeated an hour later the record showed spontaneous motor discharge at a point which had previously been silent.

DISCUSSION

It has been seen that in certain cases of radicular sciatica there are areas of deep muscle tenderness which show increased irritability and sustained motor activity within muscles which are otherwise at rest. Studies of the motor activity suggest that not all of it is due to the presence of the myogram needle. Moreover, the fact that these tender areas can be eliminated, often for days and sometimes permanently, by local anæsthesia suggests that an active process has been inhibited by the anæsthetic. If procaine is injected into the area of motor discharge, with the needle electrode in situ, the activity rapidly subsides, whereas similar quantities of saline are without effect. The immediate loss of pain must be due to the action of the procaine on the afferent pain-conducting fibres; the cessation of the motor activity may be due to the curare-like action of procaine on motor end-plates but this is uncertain and an alternative explanation will be given below.

It is of interest to consider how these irritable foci could arise. Their disposition in the extensor muscles innervated by a particular root suggests a disturbance of central origin rather than a reaction to a local inflammatory process. It is possible that the stream of impulses passing into the spinal cord from an abnormal root sets up a state of excitability which so influences the appro-

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priate anterior horn cells as to cause motor activity. The resulting contraction would if persistent give rise to local pain and so contribute to the inflow of afferent impulses, thus setting up a vicious cycle of self-perpetuating spasm, as suggested by Travell, Rinzler and Herman.[2] The elimination of this secondary source of pain by procaine would reduce the number of stimuli reaching the cord, and would so lower the activity of the affected segments that muscle spasm would cease, although the continued presence of the root lesion might lead, in the course of time, to an increase in the cord activity and a return of spasm. Certainly the day to day fluctuation in the intensity of the motor discharge and deep reflexes in the painful leg are reminiscent of those phasic variations in the excitability of the spinal reflexes which are so familiar a feature of animal experiments.

There seems little doubt that the motor discharge arises in the anterior horns. The morphological similarity between the action potentials seen in this state and those of voluntary activity suggests a common origin. Moreover it is possible to produce localised spasm of muscle by a mechanism which necessarily involves the anterior horn cells. Use was made of Kellgren's demonstration [3] that the injection of an irritant solution into an interspinous ligament gives rise to pain and rigidity in the corresponding segment of the body. In repeating these experiments, using the ligaments of the 4th and 5th lumbar interspaces, there has been considerable variation both in the amount of pain provoked and in the site to which it was referred from any given point, although the area of reference was constant for any one individual. When pain was produced, however, it was associated with an increased irritability and in some cases with continuous motor discharge in the area of reference, although clinical evidence of rigidity was absent. Pain was often present without motor discharge, so muscle spasm could not have been the cause of the pain.

The importance of the observation is that localised spasm of a portion of a muscle can be induced through a reflex path which involves the anterior horn cells, and further, that the source of the excitation may lie outside the nerve-root. Clearly the latter point provides a theoretical basis for the occurrence of muscle pain in conditions such as spinal arthritis. Electromyographic evidence of continuous motor discharge has in fact been observed in so-called fibrositis of the shoulder girdle in association with clinical and radiological signs of cervical osteoarthritis, and similar activity was found in the tender muscles of the arm and forearm in two cases of "brachial neuritis" in which sensory, motor and reflex signs pointed unequivocally to a lesion of the 6th cervical root. In these cases, as in radicular sciatica, the tenderness and motor discharge were confined to muscles with an extensor or antigravity function, and when the affected root supplied both flexor and extensor muscles the latter alone were affected. Further observation is required to determine whether this distribution is the rule and the reason for it if it is.

It remains to be seen whether a "rheumatic" focus in the substance of a muscle can give rise to local spasm. It must be remembered, however, that fibrositis is not an established pathological entity. The descriptions of the intramuscular lesions which have been published from time to time are not convincing, and even if they were accepted the changes described may be the result and not the cause of long-continued spasm, for sustained contraction of muscle impedes the intramuscular circulation, and the consequent anæmia may lead to fibrosis. Alternatively there may be both rheumatic and non-rheumatic sources of muscle pain.

SUMMARY

There is a form of myalgia, arising in muscles supplied by an irritated root, which simulates so-called fibrositis both clinically and in its response to local injections of procaine, and is responsible for a variable and sometimes considerable proportion of the patient's total discomfort. Relief from procaine does not, therefore, exclude a root lesion. Electromyographic studies show that the tender spots in the muscles are as a rule the seat of a localised increase of irritability and a continuous discharge of action potentials which lasts as long as the needle remains in the muscle. On clinical grounds it is inferred that this activity is not merely the sustained response of irritable muscle to the presence of the myogram needle, but represents involuntary spasm of small groups of muscle fibres. Certain characteristics of the motor discharge appear to support this view, but further work is necessary to confirm it. The spasm is thought to be the source of pain and tenderness. Similar activity has been recorded in "fibrositis" of the shoulder girdle, and in the extensor muscles of the arm and forearm in cases of "brachial neuritis" both with and without root signs. Muscle spasm is consequently considered to play a part in what may for convenience be called the rheumatic myalgias as well as in the less common root syndromes. On theoretical grounds any source of irritation, whether in the root or not, could serve to generate reflex spasm, but in practice there appear to be additional unknown factors which determine the presence of spasm in some cases and not in others.

My thanks are due to Lieut.-Colonel C. W. Greenway for permission to publish this article, to Brigadier G. Riddoch for helpful criticism, and to Captain Weddell and Dr. B. Feinstein for their help.

2. Travell, J., Rinzler, S. and Herman, M. *J. Amer. med. Ass.* 1942, 120, 417. 3. Kellgren, J. H. *Lancet*, 1941, i, 561.

PHEMERIDE: A NEW ANTISEPTIC DETERGENT

C. N. ILAND, M B LPOOL

ASSISTANT PATHOLOGIST TO AN EMS HOSPITAL, SECTOR VI

ATTENTION has recently been drawn to the use as antiseptics of certain compounds classified as organic detergents or wetting agents. These lower the surface tension of solutions containing them, and enable the solution to make intimate contact with—or wet—surfaces not otherwise so affected. This paper records tests made on a new substance of this type: para-tertiary-octyl-phenyl-diethoxy-benzyl-dimethyl ammonium chloride ('Phemeride,' or 'Phemerol' in the United States). It is a quaternary ammonium compound, and contains a long aliphatic chain. In this and other properties, it resembles the related substance 'Cetavlon' = ('CTAB') (Barnes 1942, Williams et al. 1943). According to Baker's (1941) classification, it is a cationic detergent—that is, the long-chain hydrophobic group is located in the cationic part of the molecule. Cationic detergents in general are more active against gram-positive than gram-negative organisms, and are more germicidal to either than the anionic detergents (Baker 1941).

The mode of action of these substances has not been determined, but they probably act by disrupting or interfering with the functions of the bacterial cell-membrane. It has been shown that various substances lowering surface tension can penetrate and disperse mixed lipoprotein monolayers, and that this power can be related to their lytic activity on red blood corpuscles, unicellular animals, and bacteria (Schulman 1942). Phemeride possesses comparable physical, chemical, and biological properties, and presumably these are the basis of its antiseptic activity.

The material was obtained as a white powder without odour which dissolved readily in water and alcohol. The aqueous solution was clear, colourless, and slightly alkaline. It had a bitter taste, and frothed on shaking. As inferred above, it is hæmolytic; a dilution of 1 in 1000 in blood causes lysis in one hour at 37° C. This is a higher concentration than is needed for bacteriostasis. It is reported as stable to light and air and non-corrosive to metals.

IN-VITRO TESTS

Bacteriostatic power in broth.—Serial dilutions of phemeride were made in broth infected with various organisms, and the cultures incubated for 18 hours (table I), *Cl. welchii* was in thioglycollate broth, and incubated for 48 hours. There is considerable difference in the sensitivity of the gram-positive and gram-negative organisms.

Bacteriostatic power in blood.—To test its action in the presence of blood the slide-cell technique was used. Dilutions of the chemical in isotonic saline were mixed with equal volumes of freshly drawn defibrinated human

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TABLE I—GROWTH OF ORGANISMS IN BROTH CONTAINING SERIAL DILUTIONS OF PHEMERIDE

Organism	Dilutions of pheméride					Control
	1/100t	1/200t	1/400t	1/800t	1/1600t	
Staph. aureus	0	0	0	++	++	++
Strep. pyogenes	0	0	++	++	++	++
C. diphtheriæ	0	0	+	++	++	++
Cl. welchii ..	0	0	+	++	++	++
	1/2000	1/4000	1/8000	1/16000	1/32000	
E. coli ..	0	0	0	0	++	++
B. pyocyaneus	0	+	++	++	++	++
P. vulgaris ..	0	0	+	++	++	++

1/100t = 1/100,000. ++ = heavy growth.

blood infected with an optimum dose of organisms. Slide-cells were filled, sealed and incubated. Results are shown in table II. The bacteriostatic power is reduced in 50% blood as compared with broth, but is still of a high order.

Antileucocytic action.—The leucocyte can be taken as a convenient type of body cell, and any chemical which has a greater antileucocytic than antibacterial action will not be successful as an antiseptic in the body. The above slide-cell experiments indicate that pheméride has not a predominantly antileucocytic effect. Further experiments were made to confirm this by studying the action of pheméride on the ability of leucocytes to emigrate, and to ingest bacteria.

Effect on emigration.—Pheméride in various concentrations was mixed with fresh human defibrinated blood. At intervals 50 c.mm.: of each mixture was placed in paraffin-wax cells

TABLE II—ACTION OF PHEMERIDE IN THE PRESENCE OF BLOOD ON THE GROWTH OF DIFFERENT ORGANISMS

Organism	Dilutions of pheméride					Control
	1/16t	1/32t	1/64t	1/128t	1/256t	
Staph. aureus	0	0	0	+	++	++
Strep. pyogenes	0	0	+	++	++	++
C. diphtheriæ	0	0	0	++	++	++
	1/200	1/400	1/800	1/1600	1/3200	
E. coli ..	0	0	0	0	+	++

1/16t = 1/16,000.

marked on glass slides, and incubated for one hour at 37° C. in a moist chamber. The blood was then removed by gentle washing, and the slides stained to show the emigrated white cells. In controls, with pheméride replaced by isotonic saline, there was copious emigration; this also occurred with weaker pheméride mixtures, but with stronger it was diminished or absent. Leucocytes still retained their mobility after half an hour's exposure to 1 in 4000, and after five hours' exposure to 1 in 8000 of the chemical. At stronger concentrations or with longer exposure they were apparently killed.

Effect on phagocytosis.—Mixtures of pheméride and blood were made as in the emigration experiments. At intervals two volumes of the pheméride-blood mixture, and one volume of a suitable *Staph. aureus* suspension were mixed and incubated at 37° C. for 15 min. Films were then made, stained, and the number of organisms ingested by a hundred leucocytes counted; 1 in 4000 pheméride stopped phagocytosis after half an hour, but 1 in 8000 did not stop it even after five hours.

Size of inoculum.—Some antiseptics, such as the sulphonamides, will inhibit the growth of a small inoculum of bacteria in a much weaker solution than is necessary when the inoculum is large. Experiments were made with pheméride using two sets of culture tubes, one of which had received an inoculation approximately 1000 times larger than the other. The same strength of pheméride caused inhibition of growth in both series, showing that it is to some extent independent of the size of inoculum.

Bactericidal action.—The cationic detergents are essentially bactericidal in effect (Baker 1941). Thus pheméride will kill *Staph. aureus* in broth in ten minutes at 1 in 20,000 concentration. In this respect it differs from the sulphonamides.

Conclusion from laboratory tests.—These experiments indicate that pheméride could be used in concentrations which, while inhibitory to common pathogens, are still not damaging to the tissues as represented by the leucocytes. The laboratory tests were duplicated with cetyl-trimethyl ammonium bromide (cetavlon). Pheméride was twice as strong in action as cetavlon under the same conditions.

CLINICAL TESTS

A small series of clinical tests were made.

Skin sensitivity.—This was tested for by 6 volunteers having 1% aqueous pheméride rubbed into the same area of skin, daily, for two weeks. Each application lasted about two minutes, and the solution was allowed to dry on. The area was not washed for at least four hours. No sign of any irritation or rash developed.

Sterilising action on skin.—Colebrook's (1930) technique was used. An area of skin 6 in. by 4 in. was rubbed for one minute with a broth-soaked cotton-wool swab which was then dropped into a 100 c.cm. of broth. For three minutes 0·2% pheméride was applied to the same area with rubbing, and the skin then rinsed with tap water for one minute, and swabbed as before. Pour-plates were made from 1 c.cm. of the broth and 10 c.cm. of nutrient agar. The results of 6 such tests (colonies per plate) were:

Before ..	15 ..	42 ..	28 ..	35 ..	40 ..	37
After ..	1 ..	3 ..	5 ..	3 ..	4 ..	0

The same strength was used for the preoperative preparation of some surgical cases. After a bath and shaving if necessary, a skin swab was taken as above; 0·2% pheméride was then rubbed into the skin for about three minutes, and excess moisture removed with a sterile towel. This process was repeated next morning, on the day of operation, the area having been covered with sterile towels meanwhile which were replaced. Another skin swab was taken from approximately the same area as before, immediately before operation, when the towels were removed in the theatre. The results were:

Before ..	150 ..	264 ..	130 ..	500 ..	250 ..	400
After ..	13 ..	11 ..	3 ..	9 ..	2 ..	17

From this pheméride appears an efficient skin antiseptic. Stronger concentrations could be used if desired.

Action in infected areas.—Pheméride was tried in some infected thoracic wounds and fistulæ. The fistulæ were infected tube-tracks following lobectomies or operations for empyema. All were infected with *Staph. aureus*, *P. vulgaris*, or *B. pyocyaneus* or all three, and had purulent discharges. Irrigation with 1 in 1000 pheméride did not succeed in sterilising any case, but lessened the discharge and bacterial flora in 3 out of 6. In 2 cases it seemed to cause the disappearance of *Staph. aureus*. An infected thoracoplasty wound, communicating with an apical cavity, and through that with a bronchus, was soaked daily with the 1 in 1000 solution. The organism was *Staph. aureus*. After a fortnight three swabs were negative for *Staph. aureus*, and showed only a scanty growth of *B. pyocyaneus*. The drug reached the bronchus and was coughed up without any ill effect. A similar result was obtained with a secondarily infected tuberculous empyema; 1 in 2000 pheméride was used to irrigate the pleural cavity in a pneumonectomy infected with *P. vulgaris*. After four days the pus, which had been thick and difficult to drain, was thin and easily evacuated. This effect of detergents has been noted before (Petroff 1941). No bacteriological improvement was recorded, at this stage, and no toxic symptoms appeared.

DISCUSSION

The possible mechanism by which the detergents act has already been mentioned. Pheméride appears to have good bactericidal properties, and is non-toxic to the tissues in strengths effective against many pathogenic bacteria. It can be placed in open wounds and the pleural cavity without apparent damage. Williams et al. (1943) recommend cetyl-trimethyl-ammonium bromide

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(cetavlon) for skin disinfection. Phemeride as shown above is also efficient in this respect, and in a higher dilution. Its potency in vitro, as compared with cetavlon, has been noted. From the small number of cases treated no definite conclusions can be drawn, except that the chemical is not toxic, and merits further study.

One of the most interesting properties of the detergents is their ability to enhance the potency of other antiseptics when used mixed with them. They have been used for this reason by Petroff et al. (1941) in the treatment of tuberculous empyema. Ordal et al. (1941, 1943) have shown this effect with phenol and some of its derivatives. The detergents used have not themselves had good antiseptic powers. If phemeride is also synergistic this would be a valuable property, and might enable better chemotherapeutics to be prepared for infected wounds and body cavities.

SUMMARY

Laboratory and clinical tests suggest that the detergent and wetting agent known as 'Phemeride' is inhibitory to common pathogens in dilutions not toxic to the tissues.

I would like to thank Prof. A. Fleming, FRS, for his advice and help; also the members of the staff of Harefield EMS Hospital, and Dr. J. S. White of Parke, Davis & Co., for a supply of phemeride.

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DEPOSIT IN SEITZ-FILTERED SERUM

G. E. C. FRANCIS, PH D LOND
DEMONSTRATOR IN BIOCHEMISTRY, MEDICAL COLLEGE, ST. BARTHOLOMEW'S HOSPITAL, LONDON

G. A. HARRISON, M D CAMB, CHEMICAL PATHOLOGIST TO THE HOSPITAL

L. E. R. PICKEN, PH D CAMB, BALFOUR STUDENT IN THE UNIVERSITY OF CAMBRIDGE

A FEW weeks after filtration through the asbestos pads of a Seitz filter a fine deposit appears at the bottom of undisturbed bottles of sterile human serum. After 6–9 months this deposit may be compacted, so that on shaking it is not re-suspended as fine particles but breaks up into flakes. In addition there may be a brittle membrane at the air/serum interface, and deposit on the sides of the bottle, more particularly if these have been scratched in cleaning. Several suggestions[1] have been made in explanation of this behaviour, but to our knowledge only C. G. Anderson, whose findings are now in the press, has attempted to determine the chemical nature of the deposit. He concluded that it consists mainly of calcium stearate with a trace of protein. This conclusion we have quantitatively confirmed. The observations recorded here all refer to serum stored at room temperature in standard MRC transfusion bottles, containing 540 c.cm. serum and about 50 c.cm. air.

CHEMICAL COMPOSITION OF THE DEPOSIT

The precipitated material from 437 bottles, each of an average age of 9 months, was collected, the supernatant clear serum poured off, and the deposit, together with adherent serum, pooled and allowed to stand in the refrigerator overnight. Next day most of the supernatant serum was siphoned off, and the precipitate suspended in 40–50 volumes of distilled water. After it had settled, the washings and decantations were repeated three times. The amount of serum finally adhering to the deposit was therefore negligible. A small fraction of the precipitate was lost in the washings. The combined deposit was then dried to constant weight (11·22 g.) in a vacuum desiccator. On an average the precipitate from one bottle amounted to 25·7 mg.—that is, about 5 mg. per 100 c.cm. of serum. Since the total solids from normal serum are of the order of 9000 mg. per 100 c.cm., the material precipitated is only a minute fraction of the whole.

The following are the results of analyses made on the above or on a second preparation obtained in the same manner.

The values for total nitrogen, by the micro-Kjeldahl method, were 1·08% and 1·12% for the two preparations. Assuming that this nitrogen is derived entirely from protein, and that the protein contains 16% nitrogen, the deposit contained close on 7% protein. Reference to this deduction will be made later.

97·7 mg. of dry deposit yielded approximately a quarter of its weight of ash. This, dissolved in hydrochloric acid and treated with ammonium oxalate, gave a precipitate which when dissolved in normal sulphuric acid needed 7·17 ml. of N/20 potassium permanganate for titration. The total calcium content was therefore 7·34%. No iron was detected. The phosphate content of the dry deposit was very low; 0·38% as P (colorimetrically determined) or 1·89% calculated as $Ca_3(PO_4)_2$.

74·2 mg. of dry deposit extracted with 3 : 1 alcohol-ether mixture yielded 4·1 mg. extract. The total lipoids amounted therefore to not more than 5·5%, of which some portion may be fatty acids extracted from soap by hydrolysis. The insoluble residue (70·1 mg.) was now treated with alcohol-ether containing a few drops of concentrated hydrochloric acid. The solid from this second extract weighed 76·5 mg. and was fatty in appearance. If all the calcium present, excluding $Ca_3(PO_4)_2$, were combined as calcium palmitostearate, this would correspond to 66·5 mg. of calcium soaps and would account for 89·7% of the dry deposit.

We are inclined to believe that the small fraction of the deposit containing nitrogen is mainly protein (see below), and that protein somehow enters into the reaction which produces a deposit consisting mainly of calcium soaps. It is in any case certain that the 1·1% of nitrogen in the deposit cannot be accounted for by contamination with soluble serum proteins: washing with some $50 \times 50 \times 50$ volumes of distilled water would remove all soluble protein. Indeed a simple calculation shows the contamination hypothesis to be untenable. Since about 9 g. out of 10 g. of deposit is calcium soaps (nitrogen free), the remaining 1 g. of material would have to contain about 0·1 g. of nitrogen—that is, about 10 c.cm. of liquid serum would have been left adherent to the washed deposit. (The fact that both fresh liquid serum and the dry deposit each contain about 1% of nitrogen is presumably fortuitous.) The contention that the nitrogen fraction cannot derive from adherent serum is further supported by the following observation. Serum from a few bottles was centrifuged at high speed in a Sharples separator, and the nitrogen content of clear serum and of unwashed sludge determined.

Nitrogen of clear liquid serum: 1·120%, 1·125%
Nitrogen of wet unwashed sludge: 1·129%

Since the sludge consisted mainly of calcium soaps, a nitrogen content of 1·129% could not be due to adherent serum alone.

The possibility of the deposit consisting of lipoids is excluded by our analyses; some 5% only of the dry deposit is soluble in alcohol-ether, and the total cholesterol was 3·8% (colorimetrically determined).

It is clear that the deposit formed in the ageing of sterile human serum consists very largely of calcium soaps, unless the calcium present be combined in some hitherto unrecognised form, not extractable by alcohol-ether but acted on by hydrochloric acid in alcohol-ether to yield material soluble in that solvent. The analyst (G. E. C. F.) is convinced that the chemical behaviour of the deposit is that of calcium soaps.

FACTORS INFLUENCING FORMATION OF DEPOSIT

From observations on more than 10,000 pint bottles of serum, it is evident that at least three factors may influence the formation of such deposits, scales and membranes as we have described—ageing, the area of the air/serum interface, and mechanical agitation. If aged sterile serum is cleared by Seitz-filtration and again allowed to age, further precipitation occurs; the onset of precipitation and membrane formation is more rapid than in fresh filtered serum, though the bulk of the material precipitated appears to be about the same. Precipitation also occurs after a third or fourth filtration.

1. MacFarlane, R. G., Macsween, J. C., Mainwaring, B. R. S. and Parish, H. J. *Brit. med. J.* 1942, i, 377.

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It is conceivable that the more rapid precipitation is due in part to the denaturation of aged, sensitive protein in the course of filtration. In serum two or three years old it is often possible to observe the formation of minute fibrils within a few hours, or at most days, of filtration.

Precipitation is accelerated in fresh serum under conditions such that the area of the air/serum interface is increased relative to the bulk of the liquid phase. If, for example, the rubber liner of the screw cap closing the bottle is wetted with serum, the liquid collects in the angle between rubber and glass, and here, in one week, an annular film of precipitate forms. That this precipitation is not due to chemical action between fillers or other components of the rubber and the serum is made probable by the further observation that if bottles are stored inverted, so that the airspace is bounded by glass, precipitation occurs in a week in any hanging drop of serum in contact with glass and air alone. The formation of membranes is suppressed in bottles filled completely so that there is no air/serum interface. On the other hand, the smallest air bubble is soon enveloped in a continuous membranous envelope. Moreover, completely filled bottles develop less bulk of deposit than do those from the same pool of serum with a normal airspace in the same period.

The influence of surface conditions on the character and amount of the deposit formed in fresh serum suggests that surface denaturation may in some way play a part in the processes leading to precipitation. This is also suggested by the well-marked acceleration in precipitation in bottles shaken over a long period (by transport in a car for several months, for example).

SUMMARY

Seitz-filtered human serum slowly forms a precipitate as it ages, about 5 mg. of precipitate per 100 ml. serum being formed in nine months. The deposit consists of about 90% calcium soaps (7% calcium), 7% protein (1% nitrogen), 4% cholesterol and 2% calcium phosphate.

We are indebted to Prof. A. Wormall, in whose department the analyses were made.

CONVULSIONS UNDER ANÆSTHESIA TREATED BY CHANGE OF POSTURE

ANGUS SMITH, MRCS, DA

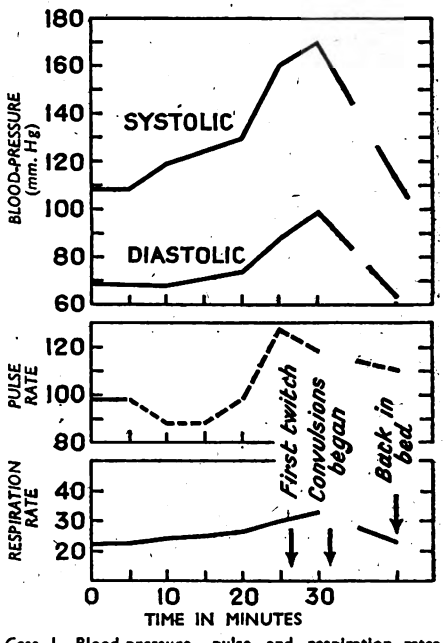
SQUADRON-LEADER RAFVR; SENIOR ANÆSTHETIST AT AN RAF GENERAL HOSPITAL

MANY cases of convulsions under anæsthesia have been reported, and much has been written about the condition. It is now generally accepted that toxicity, pyrexia and youth are predisposing factors. Fatal convulsions have been reported with all anæsthetic agents in common use, including local anæsthetics.[1] Treatment has been to raise the head and, if possible, to inject a short-acting barbiturate intravenously—a procedure more than a little difficult in a patient undergoing major convulsions.

In the 2 cases reported here the predisposing factors were present. Treatment merely by sitting the patient up was successful.

CASE 1.—A man of 20 weighing 11 st. His maternal grandmother was said to have "fits." No other relevant medical history. He received a flak injury in the region of the right shoulder, with radiological evidence of intrathoracic damage. The anæsthetic for the wound toilet was uneventful; 26 days later he had developed an infective arthritis of the shoulder due to a hæmolytic streptococcus, and it was decided to open and drain the joint. Preoperative rectal temperature was 105° F. Premedication: 'Omnopon' gr. ½ and hyoscine, gr. 1/150. Anæsthesia was induced by 0·5 g. 'Pentothal' and continued to plane 1 of surgical anæsthesia by the use of divinyl ether administered in the closed circuit. The blood-pressure and pulse and respiration rates were recorded—(see figure). The patient was sweating profusely. Oxygen was supplied at 500 c.cm. a minute; the soda-lime was fresh. Respirations were high and continued to rise. The colour was good. After 23 min. the muscles of the head and neck gave two or three twitches. The circuit was emptied and refilled with oxygen, and the divinyl ether was withdrawn. The twitching ceased; 4 min. later the patient went into a series of major generalised myoclonic convulsions. He was sat upright and the convulsions stopped. After 3 min. he was lowered without recurrence. His rectal temperature was found to be 107·2° F. His temperature in the next 12 hours was most erratic, ranging from 98° F. to 104° F. An electro-encephalogram, done some months later, was quite normal. He returned to operational flying.

CASE 2.—A man of 21, weighing 11 st. 2 lb. As the result of a grenade explosion, he had his left arm blown off and his left eardrum perforated. The anæsthetic for the wound toilet was uneventful, consisting of pentothal followed by divinyl ether in the closed circuit. Five days later a more extensive operation was contemplated. Rectal temperature was 105° F. Anæsthesia was induced with nitrous oxide and carried to plane 1 of surgical anæsthesia by means of divinyl ether, administered in the closed circuit. The pulse rose steadily together with the respiratory rate. The patient was sweating profusely. Major convulsions started with very little warning. The patient was sat upright with some difficulty. The convulsions ceased. After a few moments he was lowered and some minor convulsions started again, which stopped on returning the patient to the sitting position for 2 min. Four weeks after this occurrence the patient developed acute mastoiditis which required operation. His temperature was 106·2° F. rectal. Anæsthesia was induced by means of nitrous oxide and maintained by nitrous oxide, ethyl ether and oxygen, after premedication with omnopon gr. ½ and hyoscine gr. 1/150, administered in an open circuit. About 20° of "foot-down tilt" was given to the table, and the head was raised. Covering consisted of the two theatre towels only. Anæsthesia was uneventful.



Case 1.—Blood-pressure, pulse and respiration rates during anæsthesia.

In both these cases the combination of toxæmia, pyrexia and youth were present. The high immediate postoperative pyrexia was probably due to the exertion of the convulsions. In case 1 the rising pulse-pressure with the sudden drop in the pulse-rate just before the convulsions began suggests that the condition is linked up with an interference with the vasomotor control. The reduction of the intracranial pressure, due to venous drainage on sitting up, reduces the engorgement of the rolandic area. But a high intracranial pressure, or a high pulse-pressure, does not of itself cause convulsions in the unanæsthetised patient. In case 2 at the mastoidectomy, the measures adopted to promote loss of body heat and the slight anti-Trendelenburg position may have prevented a repetition of the previous incident. In the case of any young patient who has an acute toxæmia and pyrexia, it is probably wise to avoid the closed-circuit technique and to apply a slight foot-down tilt to the table.

When the convulsions have started, mere raising of the head may not be sufficient, and it seems advisable to sit the patient up completely.

1. Hewer, C. L. Recent Advances in Anæsthesia, London, 1943.

"... It has been obvious for some time that prohibition of the publication of research on the ground that it will disclose trade secrets has reached such a point that if it continues publication of applied research of any importance will cease. ... This situation is dangerous and will ultimately defeat its own end ..."—Lord McGOWAN, quoted in *Chemical Products*, Nov.–Dec. 1943.

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Medical Societies

ROYAL SOCIETY OF MEDICINE

ON Dec. 3 the section of Otology listened to a joint communication from Air-Commodore Dickson, Squadron-Leader McGibbon, and Squadron-Leader Campbell on

Acute Otitic Barotrauma

Air-Commodore E. D. D. DICKSON said this term was now used in the Royal Air Force for the syndrome resulting from difference between atmospheric and intratympanic pressures. During ascent ventilation of the middle-ear cleft was a passive mechanism, but during descent an active muscular opening of the eustachian tube was required before air could enter. Ventilation of the cleft depended on the degree of patency of the tube and the time available for air to flow up it. The tube could be deliberately opened by swallowing, yawning, or Valsalva's manœuvre; but if during descent this action was delayed or omitted, or was inefficient because the patency of the tube was reduced, a point might be reached at which the tubal dilators could not overcome the negative pressure in the middle ear and the cartilaginous walls of the eustachian tube were firmly pressed together. With the tube "locked" in this way, barotrauma supervened. It would also develop during ascent if air could not escape through the tube fast enough to equalise intratympanic and atmospheric pressures. Contributory causes were (1) permanent changes in the eustachian tube, affecting its lumen; (2) temporary changes in the tube, such as a cold in the head; and (3) failure to take preventive action—e.g., preoccupation, lack of time, loss of consciousness, anoxia, sleep, or ignorance.

In one series of 100 cases the predominant symptoms were: deafness alone, 31; deafness and pain, 55; deafness and tinnitus, 5; deafness and vertigo, 3; and pain alone, 6. Pain might come on suddenly or gradually; it varied from a dull earache to unbearable pain radiating over the side of the head and down the lower jaw, but severe pain was not necessarily associated with pronounced physical signs or vice versa. Deafness might be noticed during or after landing. Sometimes it was acute, presenting the features of an inner-ear or nerve deafness, without impairment of vestibular reactions; in these cases it might be permanent. In other cases it persisted only as long as the intratympanic pressure remained unadjusted or until pathological changes had resolved: this deafness was usually of the conductive type and audiometrically might show a loss in the low frequencies.

A delayed form of barotrauma, developing several hours after landing, was probably due to closure of the eustachian tube and absorption of oxygen by capillaries in the mucosa of the middle-ear cavity. Inability to "clear the ears" was a common complaint and might be due to mucosal changes (congestion or œdema) or effusion in the middle ear. Continuance of a relatively low intratympanic pressure led to vital changes in the mucosa.

The clinical findings might include (1) invagination of the drumhead; (2) interstitial hæmorrhage into the drumhead; (3) effusion into the middle ear; (4) hæmorrhage into the middle ear; or (5) rupture of the drumhead. In the absence of permanent changes in the eustachian tube the prognosis for complete recovery was good, the time depending on the severity of the changes in the mucosa of the middle ear. Permanent tubal insufficiency, on the other hand, might dictate limitation as to altitude and type of flying. No flying duties should be permitted for at least a fortnight after disappearance of all signs of symptoms; a further attack might follow if the lining of the middle-ear cleft had not returned to normal.

Treatment designed to equalise pressures should start as soon as possible. Inflation by Politzer's bag was very useful in cases seen early, but inflation through a eustachian catheter was inadvisable except in skilled hands. Inhalations and applications of vasoconstrictors to the ostium of the eustachian tube had not yielded striking results, and tests of amyl nitrite had been inconclusive. Inhalation of helium (20%) with oxygen (80%) as used with varying success in the United States had not been tried. Ascent in an aircraft, or decompression, was suitable when air-entry into the middle ear was satisfactory. Patency in the tube could be tested, in a decompression chamber or otherwise, either by visual observation of the drumhead (movement being shown by alterations of the light reflex) or by auscultation. Where there was œdema, congestion or effusion in the middle ear, rest with frequent auto-inflation was advisable.

To prevent this disabling "flying accident" some of the rules formulated by Scott in 1919 still held good. Airmen should not fly with an acute cold in the head or sore throat or when unable to inflate both eustachian tubes at will. Those who could not rely on swallowing to open their eustachian tubes repeatedly and rapidly should make a habit of self-inflating the ears by Valsalva's method at every 1000 feet of their descent.

Squadron-Leader J. E. G. MCGIBBON said that in considering the mechanics of the syndrome the middle ear might be regarded as consisting of two parts:—

(1) The membrano-cartilaginous part, a segment whose "compressible" area acts in a purely mechanical manner as a valve. The valvular action depends on the time-lag of the passage of air through the eustachian tube, and closure of the valve brings about *primary pressure occlusion* of the tube.

(2) The rigid-walled middle-ear cavities—i.e., the osseous tube, tympanum, and mastoid antrum and air cells. This part of the cleft is affected by vital changes after closure of the valvular portion. The vital changes—congestion, œdema, hæmorrhage and effusion—are caused by the relatively high hydrostatic pressure within the blood-vessels which enter the mucosa of the middle-ear cavities, which has a low tissue-fluid pressure. These changes give rise to *secondary vital occlusion*.

The greater part of the pain that might be experienced was probably due to over-distension of the vessels by the high hydrostatic pressure acting against the vascular neuromuscular mechanism. The characteristic hearing-loss for low tones might be caused by telescoping of the ossicular chain, secondary to invagination of the drumhead and displacement of the footplate of the stapes into the tympanum. The sequence of changes on descent or compression was as follows:

Normally unopened lumen of a part of the membrano-cartilaginous tube
↓
Initial rarefaction of air in the middle-ear cleft
↓
Time-lag factor
↓
Primary pressure occlusion of part of the membrano-cartilaginous tube
↓
Increasing relative rarefaction of the intratympanic air and "locking" of the tube
↓
Vital changes in the mucosa of the middle-ear cavities and *secondary vital occlusion*
↓
Equalisation of pressure by vital changes and *resolution*

Squadron-Leader A. C. P. CAMPBELL described the pathological changes found in acute otitic barotrauma experimentally produced in cats. Anæsthetised animals were decompressed to a pressure corresponding to an altitude of 20,000 feet and then recompressed. The changes affected the tympanic cavity and the immediately tympanic part of the osseous portion of the eustachian tube, and consisted in mucosal congestion, œdema and petechial hæmorrhage, and effusion (sero-mucous or hæmorrhagic). In some animals they were sufficient to offer a basis for the most severe symptoms of the syndrome as seen in man.

Major E. P. FOWLER, USAMC, described and illustrated with a film his technique of treating acute otitic barotrauma with radon. Benefit was apparently due to shrinkage or destruction of adenoid tissue in the nasopharynx and eustachian tube. The treatment had given good results in a small number of patients.

". . . for reasons plainly delivered, and always after one manner, especially with fine and fastidious minds, enter but heavily and dully; whereas if they be varied, and have more life and vigour put into them by these forms and insinuations, they cause a stronger apprehension, and many times suddenly win the mind to a resolution."—FRANCIS BACON, *Of the Colours of Good and Evil* (1597).

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Reviews of Books

Borderlands of Psychiatry

STANLEY COBB, MD, Bullard professor of neuropathology, Harvard Medical School; psychiatrist in chief, Massachusetts General Hospital. (Oxford Univ. Press. Pp. 166. 16s. 6d.)

THIS book, unpretentious though it is, shows neuropsychiatry at its expository best: critical sanity and sober breadth of view appear in it to be the outcome of a well-adjusted partnership, in which it is difficult to conceive of any divorce letting neurology go one way and psychiatry another. Dr. Cobb is staunch in the neurologist's faith; "the brain," he says, "is the organ of the mind. Only professional quibblers doubt this." He is equally staunch in the modern psychiatrist's faith: in the matter of treatment, for instance, he bears witness: "the old-fashioned therapist riding one hobby is no longer tolerable." He regards the doctors of the mental hospitals and the body of medical and psychological knowledge which they represent as the basis of psychiatry, but in this book he considers the medical problem presented by the large community of people with neuropsychiatric illness who have to be treated outside the mental hospital—epileptics, psychoneurotics, stammerers and encephalopaths. He devotes some illuminating pages to psychosomatic disorders, pointing out that the term implies a false dichotomy between psyche and soma: "the conception is intellectually sinful, but at present no better word seems to be forthcoming." Because the book is honestly written and deals with unsettled topics, it has many controversial passages, as well as much familiar doctrine reasserted. Among the topics examined in respective chapters are: speech; the function of the frontal areas, especially in relation to frontal leucotomy (as Cobb points out, the term "prefrontal" is illogical and linguistically ridiculous); consciousness; and the anatomical basis of the emotions.

Dysenteric Disorders

(2nd ed.) Sir PHILIP MANSON-BAHR, CMG, DSO, MD CAMB, FRCP. (Cassell. Pp. 629. 30s.)

IN revising this timely book Sir Philip Manson-Bahr has not found it necessary to make any vital alterations in the general plan, but he has taken the opportunity to include the many advances in ætiology, diagnosis and treatment of the last four years. The general introduction includes a useful chapter on examination of the bowel, and sigmoidoscopy. He then discusses the bacillary, protozoal and helminthic dysenteries exhaustively. Sections follow on the steatorrhœas, affections of the colon resembling dysentery, and on other causes of diarrhœic and dysenteric symptoms; and an appendix covers the intestinal protozoa and various laboratory methods. A detailed account of the treatment of bacillary dysentery by sulphaguanidine is among important new material, and a noteworthy contribution deals with the ætiology of sprue and discusses possible connecting links between pellagra, pernicious anæmia, tropical sprue and the other steatorrhœas. The text throughout is enlivened by case-notes from the author's unrivalled experience, and the figures, photographs and diagrams, many of them in colour, show that he is as skilled with the brush as with the pen. Dysenteric conditions have always assumed an important rôle in war-time and this expert review is doubly welcome just now.

Fractures and Dislocations for Practitioners

(3rd ed.) EDWIN O. GECKELER, MD, FACS. (Baillière. Pp. 361. 25s.)

THIS book is written for the practitioner who will or must undertake fracture treatment, and by confining himself to non-operative procedures the author has compressed much useful information into it. Conditions requiring operation are clearly defined but the surgery is not set out. It is not easy to describe manipulative procedures: Dr. Geckeler's accounts of them put those in many more ambitious books to shame, and the illustrations are well chosen and helpful. A few of the methods proposed will not find general favour. A Thomas splint with the arm extended is not good for permanent fixation of the humeral shaft; nor is fixation in extension adequate for separated olecranon fractures; and facio-maxillary surgeons will frown on even the temporary use of the old four-tailed bandage for mandibular fractures. He properly condemns delayed methods of reduction and emphasises the use of force reversing that which caused the break. The general standard of the book is high.

Food Inspection Notes

H. HILL, FR SAN I, FSAIA, AMISE; E. DODSWORTH, MR SAN I, MSIA, sanitary inspectors for Southgate and Edmonton respectively. (Lewis. Pp. 121. 6s.)

THIS small but closely printed volume summarises present-day knowledge of foods and their inspection to meet the needs of public health students. It is so much compressed, however, that by itself it is not an adequate guide, though it will be welcome for revision. The legal position and the various enactments, which would make an excellent approach to a study of parts of the subject, are not mentioned, and the relative importance of the different conditions found in food inspection is not perhaps made clear enough. For example tuberculosis of meat, the condition most often met with, is dealt with in less than two pages and does not give a clear idea of different glandular infections in different animals, and the way tuberculosis spreads in these animals. A list of 10 factors necessary in clean milk production omits one of the most important—sterile utensils—nor is there any hint that some of these points are vital and others of quite secondary importance. The standard of accuracy, however, is on the whole high.

Vitamins and Hormones

(Vol. I.) ROBERT S. HARRIS, associate professor of nutritional biochemistry, Massachusetts Institute of Technology; KENNETH V. THIMANN, associate professor of plant physiology at Harvard University. (Academic Press. Pp. 452. $6.50.)

IN launching the first volume of this series Prof. E. V. McCollum in a foreword again recalls the observations of Lunin who made the first experimental observations of vitamins as early as 1881. Best and Lucas review the choline problem well, bringing the subject up to date, and there is a good account of lipotropic factors in general. An appraisal of nutritional states by Jolliffe and Most maintains the high standard and will be useful to those making nutritional surveys. Subjects covered include physical methods for the assay of vitamins and hormones, the chemical and physiological relationships of vitamins and amino-acids, the photoreceptor function of the carotenoids and vitamin A, the vitamin content of tissues, growth factors, intermediate metabolism of the sex hormones, and adrenal cortical hormones. The articles are all of a high order and the bibliographies up to date.

Irrigacion Normal del Nodulo de Keith y Flack, Tawara, Haz de His y sus Ramas

EDUARDO F. LASCANO. (Buenos Aires: El Ateneo. Pp. 100.)

THIS painstaking study of the blood-supply of the sino-auricular and auriculo-ventricular nodes (as well as the bundle of His and its branches in man) will be of interest to anatomists as well as cardiologists. Dr. Lascano injected the coronary arteries with a coloured gelatin solution. Among his more interesting results is the fact that the sino-auricular node receives its blood-supply from only one of the auricular arteries, though the particular artery varies in different subjects; whereas in the case of the auriculo-ventricular node and the bundle of His and its branches there is free anastomosis between the various afferent vessels, and with the arteries to the rest of the myocardium. In other words the arteries to these junctional tissues are not end-arteries. The book is beautifully produced.

Nelson Loose-Leaf Surgery

Renewal Pages. (Nelson.)

THE latest renewal pages contain a good account of the surgery of the patent ductus anteriosus, what amounts to a monograph on local anæsthesia, articles on recent advances in general anæsthesia, and on the modern methods of treating carcinoma of the prostate. To keep this surgery as up to date as in more peaceful times is a useful service to our profession.

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THE LANCET

LONDON: SATURDAY, JANUARY 8, 1944

SHALL BASSINI DIE?

MISGIVINGS about the results of operation for inguinal hernia have been increased by observations made in examining recruits for the Services. Both in hospital and in private practice the attempted cure of inguinal hernia is one of the commonest surgical procedures; but familiarity has too often bred inattention, and the hernia operation has commonly been relegated to the end of the list when it is sometimes performed by assistants and house-surgeons without guidance. Even before the war, it was known that the recurrence-rate was high. Now EDWARDS [1] tells of 805 recurrent hernias operated on during six months of 1942 in military hospitals alone, and he estimates that these probably represent only 60% of the number presenting themselves in that short period. The original operations on these soldiers had been done—mostly in civil life—in all parts of Great Britain and Northern Ireland, and were therefore representative of the results of British surgery as a whole. Operations on inguinal hernias in fit policemen in the wards of one of our foremost teaching hospitals have been followed by recurrence in as many as 12–20%.

Faulty technique certainly accounts for a proportion of failures, and the time has come for surgeons to accept the fact that the operation is difficult and worthy of all their skill and patience. But the type of operation may also be at fault. Bassini's operation, or one of its modifications, is used almost as a routine, and its supremacy may not be justified. Changes have lately been discussed in our columns and elsewhere. For example, a modification of the Bassini operation, known by the name of McArthur, is upheld by MCLAUGHLIN,[3] while ARTHUR[4] has further modified McArthur's operation. ARTHUR stitches the conjoint tendon to Poupart's ligament, and reinforces the line of sutures by a fascial graft, dissected from the external oblique but not detached from it. He does not believe that simple removal of the sac is safe under Service conditions where subsequent abstinence from hard manual labour for a long time is impossible. EDWARDS, on the other hand, is strongly of opinion that, in the normal healthy male, removal of the sac, combined with repair of the tear in the transversalis fascia, is all that is needed; indeed he thinks that suture of the internal oblique and the conjoint tendon is destructive and should not be practised in such patients. During 19 months he and CAPPER personally operated on 131 recurrent hernias in men of military age. In 86 of them it was possible with reasonable certainty to say what was the original method of repair: in 53 this was the Bassini; in 19 the sac only had been excised; in 14 other methods, such as Bloodgood's, had been used. In cases treated by the Bassini operation the internal oblique was represented by a thin sheet of attenuated muscle, pale brown in colour. This finding supports the contention that suture of the internal oblique to Poupart's ligament is unphysiological, distorts the musculature, and by interfering with its contraction actually weakens the abdominal wall at the inguinal canal. Removal of the sac alone has long been the usual operation in children, where any further repair has been regarded as surgical interference; but dissection of the sac from its coverings must be complete, otherwise the stump will be an easy starting-point for a fresh hernia. For adults this is recognised as the most important step in the operation; but where there is a gap in the posterior wall, some method of strengthening the inguinal canal must be devised. Discarding the Bassini type of repair, EDWARDS proposes a choice of two methods. One is to dissect a flap of the anterior layer of the sheath of rectus abdominis, which is then hinged downwards and attached with interrupted stitches to the upturned edge of Poupart's ligament; this he advises only for the infrequent direct hernia. The other is to darn the gap in the inguinal wall with a Gallie fascial graft.

EDWARDS is less concerned, however, with methods than with results. Hernia can be a grave disability, and working men often pay a heavy price for surgical failure. No-one should be burdened through his best years with an unnecessary truss, and to most men radical cure of hernia at 30 is actually more important than radical cure of cancer at 70. The surgeon who takes care of the gastrectomies but leaves the hernias to take care of themselves shows a lack of proportion. It is now evident that "routine" treatment of hernia cannot be relied on to cure the condition, and EDWARDS is right in urging that the patient with hernia presents a problem deserving thought as well as care. After operation active treatment is still needed. Three weeks in bed is required, but within a day or two of operation the patient should begin graduated exercises to restore muscle tone. The custom in the Army is to provide three weeks in bed, three or four weeks in a convalescent home, and finally four to five weeks in a convalescent depot where eventually the soldier is restored to full physical efficiency before he goes back to his unit.

1. Edwards, H. C. *Brit. J. Surg.* October, 1943, p. 172.
2. Page, C. M. *Proc. R. Soc. Med.* 1943, **36**, 185.
3. McLaughlin, C. R. *Lancet*, 1941, ii, 11.
4. Arthur, H. R. *Ibid*, 1942, ii, 387.

SENSITISATION TO LOCAL SULPHONAMIDES

WARNINGS have lately been issued both here [1] and in America [2] against the indiscriminate local application of sulphonamides for skin diseases. A few cases will develop local or general sensitisation which may preclude the use of the drugs later when the patient is wounded or gets pneumonia or some other illness where he needs them urgently; for a locally acquired sensitivity can be excited by subsequent medication by mouth or injection, commonly extends to the whole sulphonamide group, and is probably permanent. Moreover, it may take 5–15 weeks in hospital to clear up the immediate effects of local sensitisation and another 3 months for the patient to lose his sensitivity to sunlight and be fit for work out of doors. The incidence is not known, but LIVINGOOD and PILLSBURY [3] report 12 examples of contact-type dermatitis arising in about 1000 cases of various skin diseases treated for more than 5 days with local sulphathiazole applications, and in all these the eruptions reappeared immediately when a sulphonamide was given intern-

1. *Army med. Dep. Bull.* November, 1943, p. 3.
2. Cole, H. N. *J. Amer. med. Ass.* 1943, **123**, 411.
3. Livingood, C. S. and Pillsbury, D. M. *Ibid*, 1943, **121**, 406.

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ally. In their paper in this issue, TATE and KLORFAJN mention 55 cases among a total of 2280 admissions to the skin department of a military hospital, but it seems likely that sensitisation is especially common in sunny climates—one dermatologist in North Africa reports 90 cases.[1] It is also particularly likely to arise in patients with chronic eczema. Thus, constitutional reactions with a generalised rash were seen by COHEN, THOMAS and KALISCH[4] after long-continued application of 5% sulphathiazole ointment to varicose eczema, and they reproduced the general reaction a week later by giving a single dose of sulphathiazole gr. $\frac{1}{8}$ by mouth. COLE[2] also reports a case where sulphathiazole ointment had been applied to varicose eczema first for a fortnight and then for a week; when sulphathiazole was later given internally there was a violent outbreak of dermatitis both at the site of the original lesions and on other parts of the body. Sensitisation seems rarely to complicate local chemotherapy of severe wounds and burns, and repeated application is needed to produce it. The tendency of a particular external application to produce sensitisation rashes is by no means constant; only a proportion of those at risk become sensitive. We know little about the factors which make one person susceptible and allow others to escape, and it is not yet possible to predict what the reaction of a given patient will be. Undue absorption is not the explanation, for general sensitivity may develop though the blood-level is low or negligible. SHAFFER and his colleagues[5] have demonstrated the passive transfer of sensitivity by the Prausnitz-Küstner technique, and their observations support the view that sulphonamides may develop antigenic properties in the body, either alone or linked with a protein. It might therefore be possible to develop a complement-fixation or flocculation test to detect latent sensitivity, even though patch-tests have hitherto proved unreliable. Meanwhile, if a patient has developed sensitivity from local application and later requires systemic treatment minute doses must be given to determine whether he is still sensitive. ERSKINE[6] maintains that desensitisation can sometimes be attained by continuing administration of a sulphonamide after it has produced sensitisation symptoms, and that the symptoms clear up quicker in this way than when the drug is stopped. TATE and KLORFAJN have apparently been able to desensitise their patients by giving full doses of sulphanilamide by mouth and continuing with it for a week in spite of the development of generalised eczema.

It is too early yet, however, to rely on desensitisation, and for the present the use of sulphonamide applications in the treatment of skin diseases should be strictly limited. COLE, reporting to the Council on Pharmacy and Chemistry of the American Medical Association[2] would restrict their use to chancroid infection and to cases of impetigo, ecthyma and pyococcal infections which have not responded to other treatment. They support COHEN and his colleagues[4] in urging that the older well-tried methods should be preferred in treating varicose eczema and ulcers. TATE and KLORFAJN go further, and would employ local sulphonamide therapy only where it may save life or prevent deformity. The Army Medical Department[1] say that local sulphonamides have a place in the treatment of skin diseases, but that more care is required in their use. They would bar them completely for eczematous subjects and would not apply them to any skin condition for longer than a week.

4. Cohen, M. H., Thomas, H. B. and Kalisch, A. C. *Ibid*, p. 408.
5. Shaffer, B., Lentz, J. W. and McGuire, J. A. *Ibid*, 1943, **123**, 17.
6. Erskine, D. *Lancet*, 1942, ii, 568.

ABSORPTION AND EXCRETION OF MINERALS

OUR knowledge of the absorption and excretion of minerals has expanded in the last four or five years, and some of the discoveries are important both for physiology and medicine. Speaking generally, it has now been firmly established that, since metals are only absorbed if they are in solution, anything which precipitates a metal in the stomach or intestine will ipso facto tend to prevent its absorption. The action of phytic acid in depressing the absorption of calcium and iron may be quoted in this connexion, and pectin has recently been shown to have the same effect on the absorption of lead.[1] The converse of this also holds, for it has been demonstrated that proteins and amino-acids, which form soluble coördination compounds with calcium and magnesium carbonates and phosphates, improve the absorption of both metals if they are ingested with them.[2]

Evidence that iron is never excreted continues to accumulate,[3] so that the manner in which the absorption of iron is controlled has become a focus of interest. By the use of radio-elements, both iron and sodium have been shown to be absorbed from the stomach,[4] so that we must reconsider our ideas about the function of this organ. HAHN and others have found that the amount of iron absorbed from a given dose seems to depend on the iron stores of the animal. Their findings in dogs indicate that a sudden change from normality to a state of severe anæmia does not increase the absorption till the storage organs are depleted of their iron to make good the loss of hæmoglobin. Furthermore, large doses of iron given a few hours before the test dose of the radio-element will so saturate the gastro-intestinal mucosa that less than the expected amount of the radio-iron will be absorbed. They point out that saturation of the mucosa can be brought about in a few hours by the administration of a large dose of iron, but that desaturation must be left to nature and takes days or weeks. The failure of the body to excrete iron makes its reactions to zinc and manganese particularly interesting. Here again we have to thank the Americans for their active prosecution of the use of radio-elements. Injected zinc[5] is removed from the blood-stream by the liver, pancreas, gut and other organs. The liver is chiefly concerned with storage, for the bile contains little or no zinc. The main organ of excretion is the pancreas, the juice of which contains more zinc than the plasma. Injected manganese also finds its way into the intestine, but by quite another route, for it is primarily and chiefly excreted by the liver into the bile.[6]

1. Murer, H. K. and Crandall, L. A. *J. Nutrit.* 1942, **23**, 249.
2. McCance, R. A., Widdowson, E. M. and Lehmann, H. *Biochem. J.* 1942, **36**, 686.
3. McCance, R. A. and Widdowson, E. M. *Nature, Lond.* 1943, **152**, 326.
4. Hahn, P. F., Bale, W. F., Ross, J. F., Balfour, W. M. and Whipple, G. H. *J. exper. Med.* 1943, **78**, 169. Cope, O., Cohn, W. E. and Brenizer, A. G. *J. clin. Invest.* 1943, **22**, 103.
5. Sheline, G. E., Chaikoff, I. L. Jones, H. B. and Montgomery, M. L. *J. biol. Chem.* 1943, **149**, 139. Montgomery, M. L., Sheline, G. E. and Chaikoff, I. L. *J. exper. Med.* 1943, **78**, 151.
6. Greenberg, D. M., Copp, D. H. and Cuthbertson, E. M. *J. biol. Chem.* 1943, **147**, 749.

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These differences in excretion are matters of fact, and they at once excite our curiosity, but the physiology behind them is still obscure, and for a time will probably have to remain so. Knowledge may be power, but in an active science it can never satisfy. Each discovery reveals such gaps in our knowledge that there is an irresistible urge to press on, and it is difficult sometimes to find time even to speak a word of thanks to the discoverers, or to take stock of the progress made.

LUPUS TAKEN SERIOUSLY

LUPUS is a form of tuberculosis which begins as a rule in childhood, is difficult to arrest, liable to recur and apt to leave disfigurement. One would expect its incidence to be well known, but there was a surprising difference in the estimates given at the RSM meeting on Dec. 16. Dr. FREDK. HEAF described it as a mere 1·6% among the 3624 cases of non-pulmonary tubercle discharged (including by death) from LCC hospitals during the five years 1931–35. Of the total 59, roughly a third were children. Searching MOH reports he found that round about 30 cases were notified year by year in the county of Lancs (pop. 1·8 million), 16 in Manchester (pop. 0·65 mill.), 4 to the Staffs joint board (pop. 0·97 mill.), and so on. Looking at the number of patients under treatment in a recent (or average) year he found 25 in Herts (pop. 0·47 mill.), 18 in Doncaster (pop. 0·07 mill.), 12 in York (pop. 0·1 mill.). Judging from figures like these Heaf estimated the yearly incidence of new active cases of lupus at about 10 per million of population, requiring 5 beds per mill. pop. and outpatient treatment for 50. But Dr. F. S. AIREY of Leicester, basing his opinion on careful observation, regarded 1000 cases per million as nearer the truth, which could not be reached without a census or sorting office, such as had been provided by A. STÜHMER for Bavaria or N. DANBOLT for Oslo. Whatever the dimensions of the need, Heaf and Airey agreed that to deal with it some project on a national scale (whether it be for 450 or 45 thousand) is required, including special lupus centres attached to existing institutions, where a team of dermatologist, rhinologist and plastic surgeon is available, and contact with medical schools so that students and practitioners may learn to diagnose the lesion early. Current teaching in the schools and in textbooks seems remote from OSLER'S "last word" on tuberculosis appealing to the practitioner for his help in the most hopeful campaign ever undertaken by the profession. Sir HENRY GAUVAIN'S contribution to the discussion was a moving picture of the child with lupus. Children, he said, are mentally far more sensitive than is generally realised: when badly disfigured their distress is often acute and has a serious effect on their future outlook on life. They should be spared from exhibiting their disfigurement to outsiders, by segregation in clinics where treatment and education can be concurrent. Lupus patients require the same regime as those with other manifestations of tubercle *plus* the local measures which have rather unwisely been narrowed down to the use of the (now unobtainable) Finsen-Lomholt lamp. On the Treloar hearthrug at Alton there has long been a development of plastic surgery to reconstruct facial deformities of children and recently Gauvain has established there a lupus colony for adults with workshops and its own social life. He believes with Airey that were the facts of lupus widely known public indignation would insist on some humanitarian scheme. The first thing is to establish and broadcast the facts, and the RSM meeting was a sound step in that direction.

Annotations

HOME-MADE PENICILLIN

THE curative properties of penicillin naturally get more publicity than the difficulties of its manufacture and purification, so that both doctor and patient find it increasingly hard to understand why supplies are still so short. The difficulties are real enough. The mould itself, *Penicillium notatum*, for reasons still unknown, varies greatly in the amount of active principle it produces, and its output must therefore be constantly checked. Bacterial contaminants quickly inactivate penicillin, and certain gram-negative coliform bacilli are particularly active in the production of an inhibitor, named penicillinase.[1] Penicillin is readily broken down by alkali or acid (that is why it is ineffective by mouth), and it is sensitive to some heavy metals, so that contact with an iron-containing solution destroys it. In the crude state the substance is very unstable and readily deteriorates. For these reasons, and because at this early stage of its therapeutic trial the quality of each batch of the substance needs to be carefully assayed, its manufacture except by accredited firms has been strongly discouraged by the sponsors of penicillin. All the same, no regulation at present exists to prohibit the production under controlled laboratory conditions of crude penicillin for local application; indeed, until it is brought under the control of the Therapeutic Substances Act, any yellow liquid could be labelled and sold as penicillin. In their report to the War Office,[2] Florey and Cairns mention some material labelled "penicillin" that was used in Sicily for the local treatment of six soft-tissue wounds; in Tripoli the wounds were sewn up and given further instillations of the same solution. All broke down with the production of *Staph. aureus* pus; the "penicillin" was then examined and found to be devoid of the active substance. An example of what can be accomplished from the local use of a crude product has been reported by Pulvertaft,[3] though we understand that this example is not to be followed in Army laboratories. An American recipe for home-made penicillin has received much publicity in the lay press. The method, modified from that originally described by Robinson and Wallace,[4] consists in the preparation of penicillin in Petri dishes containing eight layers of gauze impregnated with a sterilised mixture of yeast, glycerin, dextrose and cornflour as culture medium. The penicillium is introduced and after 4–12 days' incubation a piece of the gauze containing the living culture is applied to the infected wound, with the insecure assumption that fresh penicillin will go on being produced. This process, particularly if it is believed that it can be carried out "in the average home by anyone having a rudimentary knowledge of sterilisation procedure," would certainly bring penicillin therapy into disrepute, for there is no provision for testing the activity of the home-made brew. Moreover, it has repeatedly been shown [5] that most, and conceivably all, of the toxicity of penicillin preparations lies in the impurities present, so the more impure the preparation is the more toxic it will be. There is a risk, too, of rendering bacteria penicillin-fast by the application of filtrates too weak to be effective.

1. Harper, G. J. *Lancet*, 1943, ii, 569.
2. War Office Report on Investigation of War Wounds, 1943.
3. Pulvertaft, R. J. V. *Lancet*, 1943, ii, 341.
4. Robinson, G. H. and Wallace, J. E. *Science*, 1943, **98**, 329.
5. Hamre, D. M., Rake, G., McKee, C. M. and MacPhillamy, H. B. *Amer. J. med. Sci.* 1943, **206**, 642.

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FELLOWS ACROSS THE SEA

Honorary fellows of the Royal College of Surgeons of England are required by custom to attend in the council chamber of the college to receive their diplomas; but the president and council, anxious to give contemporary rather than belated recognition to the colleagues whom they elected at the centenary of the fellowship, have honoured this custom in the breach at both Cairo and Moscow. On Oct. 30, with their authority, at the house of the Governor General at Ottawa, Major-General W. H. Ogilvie presented the diploma of honorary fellowship to Prof. N. S. Shenstone, of Toronto, whom he acclaimed as one of the founders of thoracic surgery, for it was his technical contributions that first "established the operation of lobectomy as a safe and justifiable procedure." The Earl of Athlone, himself an honorary fellow of the college, presided over the ceremony.

Similarly, on Nov. 8, at the British Embassy at Washington, with Lord Halifax in the chair, Prof. R. B. Osgood, of Harvard, and Prof. Evarts Graham, of St. Louis, were admitted to the fellowship. Robert Bayley Osgood, who had enjoyed the friendship of Sir Robert Jones, was now known, said General Ogilvie, "wherever orthopædic surgeons are gathered together, and wherever the games of football and tennis are played throughout the world," while Evarts Ambrose Graham, editor of the *Yearbook of Surgery* ("a volume to which every surgeon in every land turns for guidance"), had introduced a method of contrast radiography in the biliary tract and demonstrated that cancer of the lung can be cured by operation. The diploma on his office wall at the Barnes Hospital will remind him of a Lister lecture still to be delivered at Lincoln's Inn Fields.

ACCELERATION OF WOUND REPAIR

Growth-stimulating powders and solutions for hastening the healing of wounds have not been welcomed with much enthusiasm in Britain; it is widely felt [1] that the natural process of repair is adequate to its occasion, and that the object of surgery should be to give it a chance. Exceptions are usually made in the repair of extensive skin losses, since their natural healing is slow, and newly-spread epithelium never establishes that intimate contact with its substratum which the skin-graft offers in ready-made form, and in the indolent wounds that fail to heal for no apparent reason. An exception should also be made for peripheral nerve injuries, the repair of which, even under favourable conditions, is abominably slow.[2] Research on the acceleration of wound healing is founded on the manifest power of embryonic,[3] and, it has now been shown, adult tissue extracts [4 5] to stimulate cell division and amœboid movement in fibroblasts and other mesenchyme cells in vitro. The use of such stimulators was first put on a workable basis by the manufacture of a dry kaolin adsorbate, 'Epicutan,' by the firm of Lundgard in Copenhagen. In Britain we have had both favourable [6] and unfavourable [7] reports of its employment. Much of the basic work on tissue extracts in wound treatment has been done by Doljanski and his colleagues [5 8 9] in Jerusalem; and from there comes a report of their most extensive clinical trial, by Mandl and Maybaum.[10] They applied saline extracts of adult chickens' hearts, daily or every other day on gauze dressings, to a variety of different wounds, and report 35 cases of accelerated healing in 58 trials. Because of the danger and uncertainty of applying the stimulating substances in solution, they have experimented with dried powders prepared from active solutions by alcohol precipitation, and report 30 successful results in 36 additional trials. The lesions were of several types—indolent traumatic wounds, ulcers, surgical wounds, and wounds which in the normal course of events would have been treated by plastic surgery. The criterion of success varies from one type to another, and is in all cases complicated by the lack of any quantitative measure of the rate and efficiency of healing. Nevertheless, these workers gained the impression that accelerated epithelialisation was the prime factor in their successes. The failures were frankly incomprehensible; neither infection, vitamin deficiency, nor any other identifiable cause was responsible for them.

1. cf. the remarks of opening speakers in the Cambridge Wound Healing Conference; *Lancet*, 1943, ii, 552.
2. Seddon, H. J., Medawar, P. B. and Smith, H. *J. Physiol.* 1943, **102**, 191.
3. Carrel, A. *J. exp. Med.* 1913, **17**, 14.
4. Trowell, O. A. and Willmer, E. N. *J. exp. Biol.* 1939, **16**, 60.
5. Hoffmann, R. S., Tenenbaum, E. and Doljanski, L. *Nature, Lond.* 1939, **143**, 764.
6. Waugh, W. G. *Brit. med. J.* 1940, i, 249.
7. Dann, A. L., Glücksmann, A. and Tansley, K. *Brit. J. exp. Path.* 1941, **22**, 70.
8. Doljanski, L., Hoffmann, R. S. and Tenenbaum, E. *Nature, Lond.* 1942, **150**, 23.
9. Werner, H. and Doljanski, L. *Ibid*, p. 150.
10. *Palestine and Near East med. J.* 1943, **2**, 136.

WAR-TIME PRESCRIBING

A NEW edition of the National War Formulary will come into use on Feb. 1, and doctors are again urged to confine their prescribing as far as possible to NWF preparations. There have been some additions to the list of scarce medicinal substances since the first edition appeared, notably catechu and colchicum. A mist. cretæ containing no catechu has therefore been introduced, and it is hoped that this will usually suffice instead of mist. cretæ cum catechu. To relieve the colchicum shortage a tablet of colchicine has been added; this is intended to take the place of mist. colchici and mist. colchici et sod. sal. when these are not available, but as far as possible the prescribing of any preparation of colchicum should be avoided. The new edition contains an unguentum sulphanilamidi, with 10% sulphanilamide, and sterile sulphanilamide powder for local application in a convenient double envelope. The appearance and taste of a few mixtures will be altered by the omission of burnt sugar from the flavouring agent, emuls. anisi et menth. pip. The additions include a mist. lobeliæ co., a strong alkaline mixture called mist. sodii cit., an alkaline powder of the MacLean type (pulv. mag. carb. co.), and a tab. aminophyllin gr. 1½.

CONVULSIONS DURING ANÆSTHESIA

THERE are nearly as many theories of the cause of convulsions during anæsthesia as papers on the subject. It has become the custom for each writer to build up a plausible hypothesis based on his own few cases, usually implying that anæsthetic convulsions represent a finite entity. The numerous apparently correct though different answers to the same question badly needed integrating, and Pask,[1] after a careful analysis of the available evidence, has helped to pull the theories together by urging the non-specific nature of these convulsions. The first description of ether convulsions appeared [2] in 1927, but case-histories published long before that time described what we can now recognise as the same thing; no particular anæsthetic agent can be blamed. Pask divides the many factors concerned in causation into two orderly groups—predisposing conditions, such as youth, infection and pyrexia, and immediate stimuli, the "triggers" which let off the convulsions in suitable circumstances, including excess of carbon dioxide, lack of oxygen, overheating and respiratory obstruction. It is unlikely that a predisposing condition alone will lead to convulsions in the absence of the immediate stimulus. The electro-encephalogram has however made it clear that the convulsive threshold varies enormously in normal people. Pask ends his paper with the advice not to ask, "what is the cause of anæsthetic convulsions?" but rather, "what combination of factors has led to this disorder which manifests itself by convulsions in this

1. Pask, E. A. *Proc. R. Soc. Med.* 1942, **35**, 545.
2. Wilson, S. R. *Lancet*, 1927, i, 1117. Pinson, K. B. *Brit. med. J.* 1927, i, 956.

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particular patient." He also advises caution in assessing the effectiveness of a single form of treatment, since no treatment is likely to be specific when causes are multiple. When convulsions do begin in the course of anæsthesia the aim must be to remove as many causative factors as possible. Such steps as temporarily stopping the operation and the anæsthetic, and giving oxygen through a perfect airway, are obviously desirable, and it may be useful, as Angus Smith maintains on another page, to sit the patient upright. (Certainly more useful than hanging the patient up by the feet, as was the expedient of a century earlier.[3]) The high mortality attending these convulsions can be much reduced if they are controlled with small doses of barbiturates intravenously. Though this is one of the rare complications of anæsthesia it is serious enough to justify preventive measures when predisposing conditions are present; these measures will include preoperative barbiturate medication, the avoidance of overheating and head-down positions, and an anæsthetic technique which ensures a free airway and an adequate supply of oxygen.

STATISTICS AND THE NEUROTIC CONSTITUTION

STATISTICAL methods enable us to predict the structure of a whole from an examination of a small part. They also enable us to treat quantitatively data which are themselves purely qualitative. Slater[2] has used them in both these ways in a study of the neurotic constitution, based on records of 2000 neurotic soldiers at an EMS neurosis centre. The summary records of these soldiers were transferred to Hollerith punched cards, and the cards were mechanically sorted and tabulated by the Scientific Computing Service. Ten diagnostic groups were recognised—organic states, head injury, epilepsy, schizophrenia, endogenous depression, mental defect, psychopathic personality, anxiety neurosis, hysteria, and reactive depression. The size of the groups ranged from 50 for schizophrenia to 647 for anxiety neurosis. The groups were then analysed by a large number of different factors. Slater gives a series of tables showing the statistically significant deviations from the mean. Pyknic habitus was most common in the endogenous depressions and least common in mental defectives. The only significant difference in asthenic habitus was in the hysterical group, where it was less frequent than the mean; schizophrenics showed no significant difference from the mean. A positive family history was present in 55·7% of patients; psychopathic personality gave the significantly higher figure of 72·5%. An analysis by personality traits showed 37% of endogenous depressions and 30% of reactive depressions with obsessional traits; endogenous depressions showed less anxiety traits than the mean, while reactive depressions did not deviate from the mean. Anxiety traits were commonest in psychopaths and, of course, anxiety states. After hysterics, those in the psychopathic personality group show the highest percentage of hysterical trait. Paranoid sensitiveness is much the highest in the schizophrenic group, again with psychopathic personality next. Omitting mental defect, poor intelligence was commonest among epileptics, hysterics, and reactive depressions in that order. No group was significantly more intelligent than any other.

A more detailed study of 400 case-records showed the highest positive correlation between traits and symptoms was among obsessionals (+ 0·76); hysterical traits and symptoms came next (+ 0·51); paranoid next (+ 0·50). These findings dispose of the supposed clinical observation that people with obsessional or hysterical personality traits seldom develop obsessional or hysterical illnesses. Slater considers his findings support the view that the neurotic constitution is very largely determined by genetic factors, though the individual neurotic illness is often a reaction to environmental strains. He looks forward to the day when psychometric measurements of neurotic tendencies will show they have a normal frequency curve in the population, similar to the curve for intelligence.

2. Slater, E. *J. Neurol. Psychiat.* 1943, **6**, 1.
3. Taylor, M. R. *Brit. med. J.* 1937, ii, 996.

SULPHONAMIDE-UREA MIXTURES

AT the beginning of the war it was found that sulphonamides applied to non-purulent wounds exerted a powerful antibacterial influence with little or no injury to the tissues. Unfortunately it soon became clear that the presence of pus or necrotic tissue often reduced or abolished the bacteriostatic action of these compounds; and many devices have accordingly been studied for counteracting this antisulphonamide effect. The method for which most success has been claimed consists of the mixture of the sulphonamide with urea; it is said that urea in high concentration—e.g., 4–20%—increases (potentiates) the action of sulphonamides in vitro or when applied to wounds.[1] Thus sodium sulphathiazole 1·0 mg. per 100 c.cm. is bacteriostatic for a certain strain of *Bact. coli*, but it is neutralised by the presence of *p*-aminobenzoic acid, 0·016 mg. per 100 c.cm. Urea, 3%, is not bacteriostatic in itself; but when it is added to the mixture of sulphathiazole inactivated by *p*-aminobenzoic acid well-marked inhibition of growth is seen. Similarly it has been claimed that the presence of urea makes sulphonamide-resistant strains become more sensitive to these compounds. Another method of enhancing the bacteriostatic action of sulphonamides has been to add small amounts of azochloramide or other oxidising agents, and it is claimed that these act in vitro by destroying traces of *p*-aminobenzoic acid.[2] On the other hand, this special potentiating action of urea in vitro is denied by Kirby[3] and by Lee, Epstein and Foley[4]; they say that in the concentrations used urea has a bacteriostatic action of its own and that the bacteriostatic action of the combination (urea and sulphonamide) is only the summation of their separate actions. Further work is necessary to explain the divergent in-vitro results obtained by the two camps. Meanwhile, the combination of sulphonamides with azochloramide or other oxidising agents has been strongly recommended by Goldberger[5] as a local application to wounds. He tried it on a very large series, but his conclusions depend mainly on clinical impressions and no detailed comparison was made with wounds treated with sulphonamides alone. The clinical value of urea plus sulphonamides for infected wounds is also maintained by McClintock and Goodale.[6] But there is evidence that experimental infected wounds treated with a sulphonamide plus urea or azochloramide fare no better than if they are treated by the sulphonamide alone; in fact the concentrated urea or the azochloramide may have a caustic effect and cause great irritation. Possibly some of the good results reported with urea may have been due to properties other than that of destroying sulphonamide-inactivators. Strong solutions of urea increase the solubility of sulphonamides,[7] and also diminish the extent to which they combine with protein.[8] Moreover, in high concentration, urea dissolves necrotic tissue, pus and fibrin, thus producing a chemical debridement and facilitating the penetration of the sulphonamide to the deeper sites of infection. These properties render it useful in certain circumstances; but in view of the controversial nature of the evidence in its favour, and the injury it may do to living tissues if used incautiously, the general employment of urea-sulphonamide mixtures cannot be recommended.

1. Tsuchiya, H. M., Tenenberg, D. J., Strakosch, E. A. and Clark, W. G. *Proc. Soc. exp. Biol., N.Y.* 1942, **51**, 245, 247.
2. Schmelkes, F. C. and Wyss, O. *Ibid*, 1942, **49**, 263.
3. Kirby, W. M. M. *Ibid*, 1943, **53**, 109.
4. Lee, S. W., Epstein, J. A. and Foley, F. J. *Ibid*, p. 245.
5. Goldberger, H. A. *Amer. J. Surg.* 1942, **56**, 353.
6. McClintock, L. A. and Goodale, R. H. *U.S. Naval Bull.* 1943, **41**, 1057.
7. Sobin, S. S. *J. Lab. clin. Med.* 1942, **27**, 1567.

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THE RETURN

Major P. H. Newman's article in last week's *British Medical Journal* should be read by all concerned with prisoners of war. Himself an escaped prisoner, Major Newman distinguishes four phases through which the average internee passes: (1) the breaking-in period; (2) the period of convalescence; (3) the period of boredom; and (4) the repatriation period. He compares repatriation with the release of pressure experienced by caisson-workers: after the normal body has been exposed to an abnormal external environment, it is liable to develop symptoms varying in severity according to the individual constitution or temperament, the period of exposure, and the gravity of conditions. Life in prison camps is demoralising and leaves the prisoner likely to be unduly troubled by the everyday struggle for existence which has to be met again after release. He arrives home in "a state of exaggerated optimism and false hope" and much depends on the way in which his family and intimates help him to regain his emotional balance. Abnormal reactions are common; "in fact," Newman says, "probably all prisoners of long standing will present symptoms to some degree." These include restlessness, irritability, disrespect for discipline and authority, irresponsibility, and even dishonesty. Others are the fear of enclosed spaces, cynicism, embarrassment in society, "rebellious views against any code which tends to restrict the repatriate's activities, and a tendency to quick and violent tempers." This decompression syndrome, when present, should generally pass off in 6–12 months, and in Newman's opinion it is only the repatriate with exaggerated or persistent symptoms that needs individual psychological treatment. All however would benefit from "long-distance guidance" by an unobtrusive organisation existing to offer help if needed, and Newman makes valuable suggestions to this end. His suggestions are applicable also to the larger problem of returning soldiers in general, who may also find life difficult. For the prisoner, however, the difficulties are usually more acute, and the public should be brought to understand them. "Some may think him peculiar, rude, objectionable and unreliable; but they must be helped to realise that he is a normal person attempting to bridge a gap in his life, often with poor or insufficient material." This is a message worth repeatedly broadcasting.

PRESSURE EFFECTS ON EAR AND SINUSES

OTITIC and sinus barotrauma are the names given to the effects of changes in atmospheric pressure on the middle ear and nasal sinuses when the ventilation of these cavities is interrupted. The otitic form, which has been variously known as aero-otitis media, aviator's ear and aviation pressure deafness, is probably the commonest disability that affects aircrew personnel while flying, excluding the results of enemy action. Its symptoms were first recorded by Bert[1] in 1878, but the elucidation of its mechanism and its establishment as an entity are to the credit of Armstrong and Heim.[2] If pressure is to remain the same at either side of the drumhead, air must be able to leave the drum during climbing and enter it during descent. MacKenzie[3] explains that while the normal eustachian tube will open passively to allow air to escape, air can only enter the middle ear when the tube is actively opened by the tensor palati and other muscles.[4] The airman with patent eustachian tubes will hear periodic clicks as he climbs, caused by puffs of air escaping down them; on losing height he must actively open the tubes at intervals. Failure to ventilate the middle ear may thus arise from causes ranging from ignorance of the methods of auto-inflation and preoccupation with urgent aircrew duties to a cold in the head or adenoids. If during a loss of height the negative pressure in the middle ear is allowed to become too great, the muscles may be unable to overcome it, and the tube is then said to be locked. This causes deafness, typically a temporary one for low tones, and earache, which may be extreme, arising partly from invagination of the drum and telescoping of the ossicular chain, but mainly from distension of the mucosal blood-vessels, which may lead to "secondary vital occlusion" of the tube, as McGibbon explained and Campbell demonstrated from animal experiments at the meeting of the Royal Society of Medicine reported on another page. Permanent high-tone deafness is an occasional sequel. The mechanism and effects of sinus barotrauma are similar.

1. Bert, P. La Pression Barométrique, Paris, 1878.
2. Armstrong, H. G. and Heim, J. W. *J. Amer. med. Ass.* 1937, **109**, 417.
3. MacKenzie, J. G. *Canad. med. Ass. J.* 1943, **49**, 301.
4. See McGibbon, J. E. G. *Proc. R. Soc. Med.* 1942, **35**, 251.

DIPHTHERIA IMMUNISATION IN FEVER HOSPITALS

ACCURATE data on the type and severity of reactions to diphtheria inoculations are less easily obtained in immunisation clinics than among hospital inpatients or resident staff where continuous observation is simple. Allen-Williams[1] has analysed the reactions in 761 Schick-positive patients immunised with alum-precipitated toxoid during convalescence from various infectious diseases. A general reaction-rate of 12·6% included rise in temperature (7%), nasal discharge (2%), local reactions (2%), adenitis and albuminuria (0·5% each), and other reactions (0·4%). Two injections of 0·2 c.cm. and 0·5 c.cm. of APT gave a reaction-rate of only 8% compared with 13% when a single injection of 1 c.cm. of the antigen was used. The experiment raises questions as to the practicability of attempting immunisation during convalescence from infectious diseases. There is a natural inclination to offer protection against diphtheria at this stage when parents may be in a coöperative mood, but the time factor is a serious difficulty in all common infectious diseases with the exception of whooping-cough, since at least five weeks inpatient treatment would normally be required to complete an adequate course of immunisation—quite apart from post-Schick testing. It might be argued that immunisation by the passive-active method would also afford immediate protection against secondary attacks of diphtheria, in scarlet fever and measles wards particularly, but this hazard appears to have much diminished in recent years. On the whole, therefore, the scope for diphtheria immunisation in fever hospital patients seems to be limited. Where it is undertaken there should be a detailed exchange of information between the hospital and medical officer of health, who is responsible for keeping accurate records of children immunised in his area.

NEW YEAR HONOURS

THREE of the four new medical knights are directors of medical services—Professor Fraser, of the EMS, Dr. Haward of the Ministry of Pensions, and Colonel Heron of Palestine—while the fourth, Dr. Thomas Jones, is honoured for his work as chairman of the Anglesey education committee. Three distinguished consultants, Major-General A. G. Biggam, Major-General Max Page, and Air-Commodore C. P. Symonds, are created Companions of the Bath, and the medical appointments to other Orders include Dr. C. H. Best, FRS, as CBE. Two knights closely associated with medicine are Prof. J. C. Drummond, D SC, who as adviser to the Ministry of Food has well used an unparalleled opportunity to apply the newer knowledge of nutrition, and Captain G. S. Elliston, MP, who, as editor of the *Medical Officer*, has always been a good friend to doctors and public health. We hope the recognition given by these honours will encourage the recipients at a time when the work of many must be extraordinarily difficult. They have the congratulations of friends and colleagues.

1. Allen-Williams, G. M. *Med. Off.* Oct. 9, 1943, p. 117; Oct. 16, p. 125.

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Special Articles

MEDICAL SCIENCE IN THE USSR IN THE LAST 25 YEARS *

Prof. N. I. PROPPER-GRASHCHENKOV
CORRESPONDING MEMBER OF THE ACADEMY OF SCIENCES, USSR

THE standard of Russian medicine was undoubtedly quite high, even before the Revolution. When the obstacles to growth created by the old régime were removed socio-economic reconstruction and advances in public health permitted a vast development in medical research.

During the first 5-year period after the October revolution a large number of scientific institutes and laboratories were established, faculties of medicine increased in number and the material basis of their existence was assured. The Soviet Government showed great interest in the progress of medical science and Lenin signed a decree providing the conditions necessary for the work of Pavlov's Laboratory in the Institute of Experimental Medicine.

In the next five years institutes for scientific research, laboratories and medical schools multiplied. The numbers of staff in these institutions were increased by bringing in young scientific workers and by sending many abroad to study in foreign laboratories. The standard of research work in our own laboratories rose at the same time.

The following 5 years saw an increase in the prestige of Soviet medical science in the international arena, evidenced by recognition afforded in other countries to our small but authoritative delegations at international conferences and congresses, and by the fact that international congresses took place in our country, in particular the International Congress on Rheumatism.

At the beginning of the next 5-year period Soviet medical science became a powerful organisation, with a large number of scientific practical institutes, laboratories and medical colleges which at that time were separated from the universities. Some good private research in limited branches of medicine was also being done.

The last 5 years, including the war period, has been one of flourishing medical science closely connected with the practical work of the public health departments. The importance of this close connexion has often been emphasised by representatives of the government. That is why the work of VIEM (the All-Union Institute of Experimental Medicine) was so highly appreciated and encouraged.

HOSPITALS AND DOCTORS

Soviet medical science has the advantage of being able to apply practically, quickly and on a large scale all the active elements of its work. The practical work of the public health departments of the last quarter of a century is enormous. Many branches of public health have been newly created.

In Tzarist Russia there were only 82,000 hospital beds in the cities (including state and private hospitals and Red Cross hospitals). In the whole vast territory of the Russian Empire in 1914 there were only 49,000 hospital beds outside the cities. The dispensaries and first-aid centres over the whole country amounted to less than 1200. There were only 14,000 doctors; in some national territories of Tzarist Russia there was only one doctor for a population of 140,000.

This situation has completely changed in the last 25 years. The number of hospital beds has risen to 500,000 in the cities, and many auxiliary public health institutions have reserve beds allowing for the doubling and trebling of the total number of beds in case of emergency, as was shown by the experience of the war period. The number of hospital beds in the countryside is more than 250,000. Dispensaries, polyclinics and first-aid posts in the cities number nearly 100,000. To this should be added new maternity hospitals in cities and villages with a total of 150,000 beds, nurseries, outpatient departments for women and children, milk-kitchens and many other institutions that did not exist before.

The number of doctors is now 180,000 and there are 100,000 students in the different medical schools. The number of middle medical staff such as male nurses (feldschers), nurses and sisters, midwives and others is more than 600,000. There were, in 1941, nearly 100 institutes for research work with 10,000 scientific workers and skilled laboratory workers. In addition there are about 10,000 scientific and skilled laboratory workers in the 82 medical schools. Before the Revolution there were 16 such schools.

IMPROVEMENT IN HEALTH

To get a clear picture of the achievements of Soviet medical science we must judge by the decrease of epidemics and infectious diseases, the lower figures for infant mortality and the longer average expectation of life. In the early days of the Revolution we set up a network of practical scientific and research institutes and laboratories for microbiology, with the object of improving prophylaxis, therapy, conditions of work, and general hygiene. As a result we succeeded in liquidating epidemics of plague by preventive measures and early diagnosis of the disease; epidemics of cholera have also been stamped out, while smallpox has been almost completely eliminated by vaccination and revaccination in childhood and adolescence, and by strict quarantine at the frontiers. There have been scarcely any cases of smallpox in our country in the last 7 years.

Intestinal infections, including typhoid, paratyphoid and dysentery, used to be disastrous both to infants and adults. By better control of the water-supply, general improvement in the sanitary conditions of inhabited localities, better supervision of food and systematic inoculation of millions of people against typhoid, we have succeeded in putting an end to mass epidemics. Combined vaccines and, in the last few years, combined anavaccines and bacteriophage, have given very good results in the immunisation and treatment of intestinal infections. Infectious diseases, such as scarlet fever, measles, whooping-cough and diphtheria, are on the decrease if we compare the figures with those of the pre-revolutionary period. Exanthematic typhus is now unknown in its old form as a mass epidemic, despite unfavourable living conditions due to the war.

In the last 10–15 years we have noted new forms of infectious diseases such as brucellosis and tularæmia. Although their mortality is not high, there have been epidemics affecting large numbers. Early diagnosis and improvement of prophylaxis have given good results. Brucellosis and tularæmia stations and the corresponding departments of our research institutes have been responsible for this work. Studies of all virus infections, particularly encephalitis which occurs in small epidemics in different parts of the USSR, have led to advances. In the clinics of our institutes a method of combined serotherapy and chemotherapy has been elaborated for cerebrospinal fever. New methods of prophylaxis and treatment with bacteriophages and the sulphonamides (streptocide, sulphidine, sulphazole) have been applied to infectious diseases.

Prophylaxis and treatment of tuberculosis have been studied at various institutes. The discovery of the importance of the nervous factor in the pathogenesis of tuberculosis of the skin gave an impulse to successful research work in other forms of tuberculosis. This research together with improved material well-being and better general hygiene has led to a considerable decrease of all forms of tuberculosis.

For the prophylaxis and treatment of venereal diseases and diseases of the skin we have created a wide network of scientific institutes, dispensaries and treatment clinics. As a result the incidence of syphilis is particularly low in our country.

In many parts of the country the incidence of trachoma was disastrously high. Now this vestige of lack of culture and hygiene has been liquidated and has ceased to be a mass phenomenon. Many who had lost their sight have now recovered it, thanks to the work of Professor Filatov, and are now useful citizens. Clinics of internal medicine and therapeutics have improved and extended the diagnosis and treatment of rheumatism, cardiovascular diseases, and diseases of the glands of internal and external secretion.

LINES OF ADVANCE

Soviet surgery, which had excellent traditions, has made important progress. Surgical technique, methods

* Article received by the Anglo-Soviet Medical Council.

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of diagnosis, X-ray diagnosis, after-treatment and physiotherapy have all improved. Academician Spasokukotski work on the sterilisation of hands and instruments under war conditions has been of great value. Much work has been done on problems of blood-transfusion. The transfusion of cadaver blood, storage of blood and its transport under different meteorological conditions and with various means of transport have been studied.

Neurosurgery, too, has reached a high level of development. It is a synthesis of general surgery, neuropathology and neurophysiology. The technique of operations on the brain, the spinal cord and peripheral nerves, and the diagnosis of diseases of the central and peripheral nervous system, are of a high order. Encephalography and ventriculography, X-ray diagnosis, and biochemical analysis of the cerebrospinal fluid, combined with early clinical diagnosis, have made it possible for the surgeon to operate on many cases of war injuries of the brain, spinal cord and peripheral nerves. Much remains to be said on the progress of neuropathology in these years. A great deal of work has been done in our schools of physiology, particularly in that of Professor Pavlov (higher nervous activity) and Professor Orbeli (autonomic nervous system).

Soviet psychiatry, in contradistinction to many Western-European schools, has based itself on the studies of Pavlov and his school into the physiology of higher nervous activity. The materialist direction of our psychiatry has led to a correct understanding of psychopathology, and to an active treatment of schizophrenia by methods according with the physiology of higher nervous activity (prolonged sleep, &c.).

The development of a new branch of clinical and practical medicine—namely, occupational pathology—must also be mentioned. The Soviet Government has taken various steps to ensure maximum security at work in all big enterprises, including mechanised agriculture. Special laboratories have been set up for the study of the physiology and hygiene of labour. As a result we have improved the conditions of work, developed new branches of physiology, and elaborated a system for the prevention of occupational diseases and reduction of their incidence. A whole series of measures has been worked out for the early diagnosis of occupational diseases. We can say without exaggeration that in the USSR in the last 5 to 10 years there have not been many serious cases of occupational disease.

Rest centres, sanatoriums and spas are flourishing, and physiotherapy has reached a high level. Hundreds of thousands of people have been treated in our numerous hospitals and institutes of physiotherapy. We have succeeded in working out our own short-wave apparatus which has become a popular means of treatment of various chronic inflammatory diseases. The shortest wave-lengths of the ultraviolet spectrum are effective in infections, and to obtain this part only of the spectrum it was necessary to construct an ultraviolet lamp with violet glass. This work was done in collaboration with the Institute of Optics, the Academy of Science and VIEM. Decimetric waves of high biological activity have also been studied, as well as the application of artificial radio-activity in the treatment of many diseases, especially cancer. Only the war has hindered its wide use in practice.

Great achievements have also been registered in pharmacology. In the study of alkaloids the late Professor Orekhov played the leading part. He studied 47 types of alkaloids, some of which he synthesised. In 1935 one could find in international publications a description of 20 types of alkaloids, 14 of which he had discovered and described.

The close connexion between physicochemistry, organic chemistry and biochemistry has provided the opportunity for the discovery of new laws in medicine. The process of formation of amines discovered by Professor Braunstein, the research of Professor Parnas into chemical exchanges in muscle, and others have indicated new methods of diagnosis and treatment.

The progress made in maternity and child welfare, and in the theory and practice of nutrition are of major social importance.

This is an incomplete picture of the achievements of Soviet medicine. They have been recognised in the Stalin prizes given to medical scientists such as Pavlovsky, our greatest parasitologist, and his close collaborator Petrichtchev, Smorodintzev and his collaborators Levkovitch, Tchumakov and Soloviev, for their work on viruses; the biochemists Bach and Braunstein; the leading Soviet physiologist Orbeli; our famous surgeons, Burdenko, Spasokukotski, Yudin and Vischnevski; the morphologist, Lavrentiev, and Zavarzin, and Gurvitch who worked out the mitogenetic radiation of tissues.

WAR

The war has not disrupted our medical scientific work which was quickly adapted. The treatment of wounds by surgical methods and of infections with bacteriostatic and bactericidal agents is now the chief problem. Medical science as well as public health can fairly register on their balance-sheet the results of the activity of the military sanitary services published by the Soviet Information Bureau on the anniversary of the outbreak of war between the Soviet Union and Hitlerite Germany. This stated that as a result of the good work of the service 70% of our wounded could return to their units, whereas the German medical services returned only 40%.

The past quarter of a century, under the Soviet system of government, has been a period in which medical science and practice, as well as of other branches of culture, have flourished.

RECOVERY AT HOSPITAL

How should a hospital provide rehabilitation? Each hospital will have its own answer to this question, but the Ministry of Health is able to supply some stimulating ideas.[1] Rehabilitation, it says, "is now becoming recognised as a form of therapy applicable to almost every type of illness or injury, in lesser or greater degree, and affecting the whole period of hospitalisation and convalescence." Ideally a hospital should begin to provide it in the ward on the patient's admission or as soon as possible thereafter, and convalescence should be planned to speed the recovery of physical and psychological function; and it is also needed for selected groups of outpatients.

The Ministry recommends that the programme for each patient should be prescribed by the physician or surgeon in charge of the case, and a sample prescription form appears as an appendix. The main emphasis is put on active movements rather than passive physiotherapy, for experience has shown the value for the patient of a sense of activity. Remedial exercises begin in bed and continue in the gymnasium or out of doors. Organised games "help to promote freedom and spontaneity of movement, the excitement of competition breaking down the protective safeguards which a patient is always apt to erect around a damaged part of the body." Occupational therapy is either diversional or remedial, and branches of hospital service such as ward work and kitchen work are often incorporated in the rehabilitation department so as to turn the attention of the sick or convalescent away from their disabilities and towards their capabilities. Lectures and debates are important because the day's programme must include periods of complete physical relaxation combined with active mental exercise. Patients discharged before they are fit to work must not be allowed to drift, and here a big responsibility rests on the medical staff and the almoner. Where fresh work is needed, local officers of the Ministry of Labour can often help in resettlement in industry, and if possible the physician or surgeon should see the interviewing officer.

The Ministry thinks that the various activities of rehabilitation should be supervised by a single member of the medical staff, who can hold conferences with the rehabilitation staff and develop a corporate spirit among them. Such supervision, it is claimed, "in no sense interferes with the continuity of control exercised over the individual patient by the original physician, surgeon or obstetrician who orders rehabilitation therapy and with whom the medical supervisor works in close association."

Hospitals are recommended to work out a progressive programme. "It is better to commence with hospital inpatients and build up an appropriate scheme of rehabilitation suited to their needs than to plunge prematurely into arrangements for outpatients before the necessary accommo-

1. Organisation of a Hospital Rehabilitation Department. Emergency Medical Services. Memo No. 6. London. HM Stationery Office. 1943. Pp. 10. 2d.

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Reconstruction

THE FUTURE OF NURSING

THE Royal College of Nursing committee, chairman Lord Horder, having scored a notable success with the first section of their report,[1] now make further sound and farsighted proposals for the future of nursing.[2]

EDUCATION AND TRAINING

They lay due weight on the disadvantage under which the student nurse at present labours as a paid employee of the hospital. Her interests as a student inevitably take second place to hospital convenience while she is paid a salary, however small. The policy, encouraged by the Rushcliffe report, of increasing the pay of the student nurse in order to attract candidates has often been criticised in these columns. The Horder Committee are equally opposed to it; and propose that student nurses should pay for their training where possible, though they add that no good potential nurse should be debarred from training by lack of means. Expenses of such candidates should be met, they hold, by liberal grants and scholarships from national and other funds.

It must be borne in mind that the great and increasing nursing service of the country cannot possibly be recruited only from the ranks of those who can afford to pay for training; and some feel that to have two groups, one paying and the other maintained by scholarships, might foster an illusion of class distinction—though this is not the experience of universities. It does imply, however, such a pronounced change in the system on which nursing has developed as might not be immediately acceptable; whereas the plan of providing for student nurses by bursaries derived from public funds, not payable to her by the hospital, would have much to recommend it, and has successful parallels in the teaching profession.

The trend towards regional organisation of health services is well recognised in the report. The committee suggest that groups of hospitals should link together to provide nurse training units; training schools, they consider, are at present too numerous, and the offer of training has been used in some places as a means of attracting staff. They foresee an increased ratio in hospitals of registered nurses and enrolled assistant nurses to students; and consider that hospitals not fitted to be training schools should be entirely staffed by qualified women of these two grades. Nurse training units should, they suggest, consist either of large parent hospitals offering opportunities for training in specialties in subsidiary hospitals; or groups of smaller hospitals which have combined to provide the complete basic training. Each unit would have its own nurse education committee composed of matrons, nurse teachers and members of the medical staff with power to coöpt representatives of the teaching profession or other suitable people.

The committee recommend a wider basic training in general nursing, covering 4 years and including short periods of experience in obstetric nursing, fevers, tuberculosis and mental nursing, with an elective six months in a specialty in the last year. The block system is emphatically advocated. During block periods the student would be completely relieved from ward work, and would attend lectures and classes in the school. She would begin with a 12–16 weeks' block in the preliminary training school before going into the wards. During her first and second years she would attend two blocks, each of 7 weeks, and in her third year a 2-weeks' block. In the fourth year arrangements would be elastic. This system, which has had great success wherever it has been tried, relieves the student nurse of the combined strain of ward work and study, and makes it easier to link up her theory and practice. General adoption of the block system would entail, the committee think, a state subsidy to hospitals, coördination of the hospital system, and an increase of ⅛ to ⅓ in nursing staff.

Once a wider basic training has been provided for every nurse, the committee hold that all parts of the register other than the general part should be converted into post-certificate qualifications. In the meantime they have considered the position of nurses on special parts of the register, and recommend: (1) that the part for sick children's nurses should be retained at present; (2) that there should be only one examining body—the GNC—for mental nurses, and that the examinations of the Royal Medico-Psychological Association should now be discontinued; and (3) that the fever part of the register should become an extended two-year post-certificate course in infectious diseases, candidates to spend one year in a fever hospital and one in a sanatorium. They also propose reconstitution of the General Nursing Councils on more truly representative lines.

RECRUITMENT

It is worth noting that entrants to the nursing profession have never shown a falling off; in fact there was a steady increase in recruits in prewar years, with a sudden rise after war broke out (despite competition from other sources). There is nevertheless a serious shortage which is accentuated both by the growing demand and by the great wastage—amounting to almost half the entrants—of nurses in training. The problem, then, is not only to attract girls into the profession but to make them content in it. Essays from schoolgirls and replies to questionnaires sent to business girls threw their usual vivid light on the deepest potholes in the road to progress. Fear of being cut off from friends and outside interests was a very general objection; and rightly so.

In such an enlightened report this drawback in the existing service might perhaps have been given greater emphasis; it was momentarily discouraging to read "the fact that the nurses cannot always be free in the evenings is less irksome for them than for workers in less interesting jobs." Nursing, no less than the nurse, suffers from the rigid segregation which is the rule in the profession.

Other objections raised were based on lack of information and on accounts of hard work, poor food, inadequate pay, and long working span. The committee wisely advise a further study of the three-shift system with a view to its wide adoption. Schoolgirls say they are prepared to work hard provided the ultimate reward is adequate; to meet this view the committee recommend such improvements in conditions of service as national contributions to nursing education; more domestic help in hospitals; a modern outlook on discipline; establishment of nurses representative councils; better catering; better chances to develop a personal life; and more attention to the nurse's health.

On the academic side, they believe in the extension of pre-nursing courses. By introducing more courses of the kind into schools they think it should be possible to recruit more girls whose education has extended to the age of 18. Nurse teachers might be employed in schools to prepare girls taking pre-nursing courses, and whole-time courses might be further developed in polytechnics. They propose that "nurse cadet" and "sub-probationer" schemes which fall short of the standard for pre-nursing courses required by the GNCs should cease. Nursing recruitment centres like that sponsored by King Edward's Hospital Fund for London, could well be multiplied. The existing centre has amassed valuable experience in the placing of candidates; and thanks to the coöperation of the Nuffield Provincial Hospitals Trust has been able to extend its services to the whole country. Recruitment campaigns and press publicity have their place in attracting candidates, but the committee place their faith chiefly in improved conditions as the best recruiting officer.

1. Nursing Reconstruction Committee of the Royal College of Nursing. Section I: The Assistant Nurse. See *Lancet*, 1942, ii, 375.
2. Sections II and III: Education and Training; Recruitment. Obtainable from the Secretary of the College, 1A, Henrietta Street, Cavendish Square, London, W.1. (2*s*. plus 2*d*. post.)

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dation has been secured and the team trained. In the same way, it is far better to provide a well-varied half-day programme, which will sustain the interest of a patient, whether inpatient or outpatient, and keep him well employed, than to embark on a full day's programme without the necessary facilities." The goal, however, should always be kept in view.

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In England Now

A Running Commentary by Peripatetic Correspondents

Mr. Churchill's personal report on his pneumonia must be one of the most widely read and widely welcomed case-notes of all time, and is also an example of his engaging contempt for fiddling details. In broadcasts his unique pronunciation of NAZI neatly suggests that he has never thought it worth while to find out what Hitler & Co. call themselves, and in the House of Commons the other day he struck an answering chord by declaring that he has no head for figures, and neither had his father ("these damned dots. . . ."). This time it is pharmacy that, like the man in the street, he has no head for. I don't know which of the sulphonamides he was given—from its total lack of side-effects it seems to have been sulphathiazole or one of the newer ones—but Mr. Churchill just calls it M & B (reminding him of his bodyguard, Moran and Bedford). Even a nomenclature committee, however, will take this cheerfully in the circumstances.

* * *

To those of us who think we have been working very hard and very fast for a very long time it is peculiarly annoying to be told that we look very well on it. When our subjective sensations and an occasional surreptitious glance in the mirror bear out the diagnosis of good health it is still more annoying. What about all those chronic ills said to follow protracted overstrain? Where is the hypertension, the cardiac angina, the duodenal ulcer, the intractable respiratory catarrh? It is almost with a sense of grievance that one records their absence. Indeed, there is a sneaking sense of guilt that in the years before 1939 one must have been consistently underdoing it. One of the blessings of good health is that it should, at least, enable its possessor to work himself to death in half the time it takes your chronic invalid; but it seems that even this blessing is sometimes denied him. Your healthy doctor knows nothing of the joys of a periodic spell in bed with influenza or lumbago—preferably during an epidemic. He is expected to sympathise with the sufferers when, in fact, his feeling towards them may only be one of envy.

* * *

A glance through the counterfoils of the death certificate book at the year's end is always interesting, sometimes salutary and not necessarily depressing; many people, as Saki reminded us, are enormously improved by death. The counterfoils do not, of course, furnish a complete bill of mortality for any given practice, for some patients die in hospitals or other institutions, or, more tactfully still, while visiting relations and away from their normal habitat. In 1943 there were mercifully few unanticipated deaths. I notice a brace of nonagenarians and a fairly large covey of octogenarians; well, no sympathy need be wasted on these, or indeed on another dozen who reached 75 or over and 50 contrived to enjoy what *Punch* calls more than their allotted *spam*. But we had a carcinoma of lung who died at 47 and a carcinoma of colon with multiple metastases who only got to 46. Then there was that poor little 8-year-old epileptic who apparently died from exhaustion after a long series of fits; a baby who died of apical pneumonia, and a couple more newborns of congenital atelectasis. There was a boy with Hodgkin's and a young man of 24 with chronic nephritis of nearly 20 years' duration who ended up with pericarditis. There was also a gallant professional brother who cheerfully endured the pain of coronary thrombosis till I was able to reach him with morphine, for which he was quite unduly grateful—a lesson to all of us on how to die gracefully and without fuss.

* * *

In the Army all things are possible, and especially in the matter of postings. The enthusiast who, at the depot and training establishment (of blessed memory), dreams of the forthcoming opportunities for collecting material for his MD thesis, finds himself principally concerned with getting rid of his precious clinical material through the narrow channel of an evacuation tent. And it is equally possible for the MO without any idea of composing a thesis to enter a vast general hospital which the research student would immediately recognise as a clinician's paradise. But if these seeming incongruities are more conspicuous in the Army than elsewhere, so are the kaleidoscopic changes which are liable to happen with startling suddenness. Eighteen months in a field unit sufficed to make me Father of the House. Incidentally I had reached the stage of looking back with awe and forward with apprehension on my obligation in civil life to teach medical students. At the same time, so much improved were my capabilities as a minor administrator that I had practically made up my mind to apply after the war for a job as manager of a departmental store, or alternatively to run for dean of the faculty. Suddenly, however, I was jolted out of this state of resignation by a brief encounter with the CO. Emerging from the company office with a bland smile on his face he said: "Well, Popplethwaite, you're leaving us. You've been posted to a general hospital." The axe had fallen. I had been severed from the unit. I suddenly became aware that my roots had struck very deep.

* * *

It was the 4th Officer who taught me what a silly word is "schizophrenia." He has a mellow voice and I can hear him in the other officers' cabins. With No. 1 he is reverent, all that a junior officer should be, inquiring, ready to applaud, on the whole a listener, reserved about his private affairs, anxious for approbation. With 2 O. he is primarily a student of navigation, more independent and less senile, friendly, but not too friendly. With 3 O., with whom he was on the *Conway*, he is continually bickering in a fraternal way, frequently resorts to violence, insinuating that he is even a Red Bulgarian, is inconsecutively loquacious about his home, his work, his girls and his bodily functions. I have seen him several times with the Captain, when he hardly recognised me, such was his concentration on playing the model junior officer. With the engineers he is courtly and distant, as one of the royal house to the aristocracy; with stewards he is authoritarian in a polite way. For his lady friends he has at least a dozen personalities to offer, all of them dazzling—and I expect he has a dozen more for his home hunt. He is, in short, an ordinary young man with as many different facets to his personality as a fly's eye: in fact, for adaptability, definitely Category A.

Cat. B includes children who get along with half a dozen veteran personalities from the old barbaric world; those roughing puberty who have lost the old and not acquired the new; country oafs; the shy; those who are more interested in things than people; semi-solitaries; women-haters; atrophic old men of both sexes who don't care. Cat. C contains the real one-track minds, the solitaries and the dual personalities, the strange thing about the last being that they have only two and that they are stranded, having lost or never had the connecting links. Most of the famous so-called dual personalities, like Turner the artist, and Baron Corvo, had at least four or five. Multiple personality is, in fact, the mechanism by which a person adjusts himself in the human mosaic, each bit of which—such is our lack of sight and insight—thinks it knows the real George. Schizophrenia is an inability to have and to hold any personality at all, a failure of the whole mechanism; there's no splitting about it. But even this is only a way it shows itself, a symptom. The real cause, surely, lies down at the bottom in the deep, dark genes.

* * *

Steve bain't used to sickness so when he got 'flu he took it hard. Depression took a firm hold and was not to be shaken off. I got a bit tired of seeing all my exhortations greeted only with a shake of the head. "Look here, Steve," I said, "you'll never get well shaking your head that way. Try shaking it up and down." Next time I saw him he was his old, rubicund self again. "I shan't fergit what you tole me, darcter," he said. "Shake the 'ade hup and down and not from zide to zide. That's wot done it." Surely this is psychotherapy reduced to its simplest terms.

* * *

Like Charcot's malade à petit papier, my patient brought a neat summary of his multiple complaints with him when he came for the first time. Here, though, the reason seemed different, for the autobiography started with, "History. I am suffering from inarticulate Streptococci Fibrositis . . ."

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Letters to the Editor

COMMON SENSE IN ANÆSTHETICS

SIR,—Dr. Mallinson would have us believe that there are only three anæsthetics: 'Pentothal'; nitrous oxide with oxygen; and spinal—which ought to be used whatever the operation. Most anæsthetists have a larger selection from which to choose and I venture to say there are few of us whose list does not include ether.

During the early weeks of June, 1940, when no other anæsthetic was available, several hundreds of shocked and badly infected patients were anæsthetised by my colleagues and myself with ether. Among the operations performed were fore-quarter excisions for gas gangrene, laparotomies and extensive wound toilets. Many cases had been wounded for several days without having received any surgical attention whatever, and their condition was often desperate. The method most generally used was a semi-open one, the mask being covered with a sheet of jaconet. Because several cases had to be anæsthetised at a time, nearly all were intubated. Very small amounts of ether were necessary and it was remarkable how free from after-effects the patients were and how little the anæsthetic appeared to increase their shock.

I admire Dr. Mallinson's enthusiasm, but I cannot help feeling that perhaps his opinions are not backed by a very large experience of anæsthetics other than the ones he so ardently exhorts us to use.

STANLEY ROWBOTHAM.

SIR,—I agree with much of Dr. Mallinson's subject matter, but I cannot subscribe to the wholesale condemnation of ether. His letter rather suggests that if there are any dangers or complications during anæsthesia or afterwards they are entirely due to ether. This seems to me somewhat extravagant. However I do think that Dr. Mallinson has struck a useful note in pointing out that the indiscriminate use of ether is unsound. It might have been as well if he had criticised the administrators of ether and not loosed the full force of his criticism on the reagent. After all, the reagent is merely the servant not the master. An anæsthetist of Dr. Mallinson's experience must have seen many dreadful displays of etherisation which could not have been entirely due to ether. The danger of ether lies in its easy administration; thus the occasional anæsthetist considers it to be absolutely safe, and so long as the patient gets off the table alive he feels the anæsthetic is successful. I wonder.

I agree that ether has many drawbacks and faults, but I think that Dr. Mallinson's list of complications and dangers is rather unjust to it. Like every other anæsthetic, it should be carefully given, after adequate preliminary examination, to suitable cases. If the necessary precautions are taken the list of complications will appreciably shrink.

I still think ether the best anæsthetic for "bad risk" patients and especially for those who are anæmic. For these cases I find the Oxford vaporiser to be the best method. This machine is, I think, a great step forward in anæsthesia; with it the patient is not soaked to asphyxia as sometimes happens with what we are pleased to call "open ether." I have used the vaporiser since its invention and I find my results are uniformly good, much better than with the open method. I quite agree with Dr. Mallinson's view on nitrous oxide and 'Pentothal.' I use often this method and like it, but I bear in mind that it is not so difficult to kill with pentothal. My own preference is pentothal, nitrous oxide with a "run through of ether"—a method which I believe is far in advance of nitrous oxide and pentothal alone, because it gives a much more elastic anæsthesia. In spite of all that can be and has been said about it, ether is a stimulant: I make a plea for its judicious use.

Royal Infirmary, Sheffield. J. B. H. HOLROYD.

SIR,—Though not a specialist I had considerable experience in anæsthetics in Flanders during the last war. In a CCS in the Ypres salient to which I was anæsthetist the usual anæsthetic was a mixture of warm ether and chloroform given by means of the well-known Shipway apparatus, though we also used N_2O and O_2 and spinal anæsthetics. From Oct. 1916 to Jan. 1918 we were on duty at least 12 hours daily and often longer; during that period, among some thousands of cases, I had only one death on the table, and that in no way connected with the anæsthetic. As to after-effects, I found in going round the hospital very little evidence to support the sweeping statements of Dr. Mallinson. Other anæsthetists' experience agreed with mine. These facts, I think, bear out the contention that ether is a safe and efficient anæsthetic for war surgery.

Wadebridge, Cornwall. A. COLERIDGE.

SIR,—Dr. Mallinson, we feel, must be discussing patients whom he has anæsthetised since leaving Horton; for one of us (E. J. R. S.) who operated there on cases receiving his "modern anæsthetics" cannot confirm the happy experience of the method which Dr. Mallinson is now able to report (*Lancet*, Dec. 11).

From the surgeon's point of view, there was far less peace of mind, and it seemed no greater safety for the patient while the method was being used. Moreover, patients were apt to move, which can be dangerous—for instance, during dissection of the axilla in radical amputation of the breast. E. J. R. S. operated for four years in the same theatre and in similar circumstances; during the first two years Dr. Mallinson's "modern anæsthesia" was largely employed, and during the second two, other anæsthetic methods often including ether. He was unable to conclude that "modern anæsthesia" was safer for the patient either in the theatre or afterwards, or more helpful and satisfying to the surgeon. Resuscitation in the theatre was far more often necessary in the period in which "modern anæsthesia" was used than in the second one, as the theatre sister corroborates; and the staff of the wards was by no means unanimous that the method lightened postoperative care in all cases. The patients were sometimes knocked out for a day or two after operations which usually give little anxiety with other methods of anæsthesia, and seemed to be suffering from shock. Spinal anæsthetics, administered by the Wilson technique, were sometimes followed by very severe headaches lasting up to a week, and in our view these were true spinal headaches. Very low blood-pressures after high spinals were noticed—one case developing postoperative mental changes severe enough to cause a neurologist to give a bad prognosis. Patients were often cyanosed to an alarming degree, and one of these collapsed on the table and died some hours later. Dr. Mallinson's greatly improved results are evidently the outcome of his increased experience; but this leads us to doubt whether a doctor can in a few weeks become as safe an administrator of "modern anæsthesia" as he suggests.

Dr. Mallinson refers to 'Pentothal' as an "almost entirely non-toxic drug." Yet a small dose will produce collapse in one, whereas the same dose in an apparently similar subject produces no comparable effect; again, one subject recovers rapidly from a large dose of pentothal in a short time while another, again apparently similar, takes many hours. We consider pentothal an extremely potent drug. During the last eighteen months, in another hospital, we have abandoned the use of intravenous barbiturates for some types of operations because of the commonness of early collapse. Such a powerful depressant requires much skill and experience in its use even in short operations, and even more in long ones.

It may be true that 90% of casualties amputated through the thigh in CCSs during the first world war "died after chloroform and/or ether anæsthesia"; but that was not the experience of one (H. A. R.) of us who spent considerable time in 1917 at advanced CCSs. Besides, resuscitative methods have improved since 1914–18; patients at the base are now often fitter and surroundings more favourable to major surgery than they were then; so that the risks are less, even if such a toxic drug as ether is used!

Is it essential, or desirable, for the patient's comfort and benefit that he should, in 40% of cases, regain consciousness at the end of the operation? We find the figures in table III (total postoperative morbidity and mortality) remarkable, and contrary to our experience in regard to pulmonary complications in patients who have received "modern anæsthesia" including spinals. It has been shown that the site of operation rather than

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the anæsthetic is the chief factor in determining post-operative complications; and the incidence after high spinals is no less than with other methods. Spinal anæsthesia should surely only be selected when it has some definite advantage for the patient.

As you point out in your leader, the anæsthetist who is capable of using all agents and methods will serve his patient best. Chloroform and ether still have their place, and the ability to use these, as well as modern methods of anæsthesia, is only acquired after at least 12 months' apprenticeship as a resident anæsthetist in a suitable hospital. Lacking such a thorough grounding in principles, the anæsthetist cannot be sure that increasing experience will augment his judgment.

H. A. RICHARDS.
E. J. RADLEY SMITH.

TONSILLECTOMY

SIR,—The technique described by Major Morey in your issue of Dec. 25, however attractive to patient and onlooker, has certain inherent snags which he does not emphasise. It involves mental strain for patient and surgeon, and although the operation may be quite painless it by no means proves an unqualified success in females with an unstable temperament.

Again, a fair proportion of patients exhibit sensitivity (in varying degrees) to these local anæsthetics and to adrenaline, and unpleasant though evanescent symptoms at the start can easily upset the even progress of the operation. But the most serious snag is the risk of hæmorrhage an hour or two later as the effects of the adrenaline and local anæsthetic wear off—and when the surgeon has left the patient. This danger prompted me to abandon the technique a long time ago. Actually the local anæsthetic method does not lessen postoperative pain or shorten convalescence. There is, in my view, no safer and more satisfactory technique than the nasotracheal tube of Magill using ether, and the Boyle-Davis mouth retractor, without preoperative sedation of any kind.

Liverpool. JOHN ROBERTS.

PROFLAVINE-SULPHATHIAZOLE MIXTURE

SIR,—In your leading article of Nov. 6 you referred to the criticism which has been put forward against the use of proflavine in the treatment of infected wounds; it therefore seems opportune to draw your attention to our own experience and that of others on its proper application for this purpose.

From experiments in the chemotherapy of anaerobic and other infections (*Lancet*, 1943, i, 793) we found that the best prophylactic and therapeutic results were obtained with a mixture of drugs, since no single drug was equally effective against the various types of infection which might be met in field conditions. We selected a mixture of 1% proflavine in sulphathiazole because this mixture is at present the most potent and most readily available one for application against gram-positive cocci, anaerobic bacteria and contaminants such as coliform organisms, *B. pyocyaneus* and *proteus*. It certainly has been shown that such contaminants should be avoided because of their delaying effect on the healing of wounds.

These findings were put forward in a recommendation to the War Wounds Committee of the Medical Research Council, and the proflavine-sulphathiazole mixture was issued for therapeutic trial. We were glad to see in your issue of Dec. 11 that Mitchell and Buttle have used this mixture in a small series of wounds that were closed up and healed by first intention. Their experience is what we would have expected from our own experimental trials and the clinical trials of others. Our results on the tissue toxicity of various chemotherapeutic drugs, just published, show that when the acridines, especially proflavine, are used in proper and effective concentrations they produce only slight local effects. Furthermore, tests with the proflavine-sulphathiazole mixture showed that it produced no more injury and no greater delay in the healing of clean incised wounds than sulphathiazole alone (*J. Path. Bact.* 1943, **55**, 477). On the clinical side this mixture is now being used in the Middlesex Hospital and other hospitals for the prevention of wound sepsis and the treatment of infected wounds. For the local treatment of wounds the mixture is applied in the same manner as the sulphonamides and has led to a rapid clearing up of the infection and healing in many cases.

From what is known of the mode of action of chemotherapeutic drugs on bacterial metabolism it seems unlikely that any single drug will be universally active against all types of organisms. Until such a substance is found it would appear that a mixture of drugs is the only alternative for the prevention and treatment of wound infection. There is still much to be learnt about wound infection and its control, and our knowledge can only be extended and completed by rigid bacteriological control of wounds during treatment.

Bland-Sutton Institute of Pathology, Middlesex Hospital. J. MCINTOSH. F. R. SELBIE.

INFANTILE D AND V

SIR,—Diarrhœa and vomiting are a pair of associated symptoms which in infants and children are commonly found in two groups of infections—namely, alimentary and respiratory. At the beginning of the century the *primary* alimentary infections made a closely correlated group recurring every summer in epidemic form in all our large towns and urban areas. The mortality was tremendous, the organism or organisms unknown, but the epidemiology was well understood. The relation to insanitary disposal of excreta and to a high atmospheric temperature was soon found to be mainly an expression of fly-borne infection, though Peters's classical observations in Mansfield showed how often adults with mild diarrhœa conveyed infection from place to place.

In 30 years this epidemic diarrhœa has become almost extinct even in large cities and a generation has grown up which is almost unacquainted with that disease. There remains a comparatively small number of cases in which the symptoms of D and V, or perhaps only frequent green stools, are *secondary* to respiratory infection. I have just visited some 50 children, mainly under one year of age, in the cubicles of Alder Hey Children's Hospital. Not one had a primary alimentary infection and most of them had respiratory infections—e.g., bronchopneumonia or otitis media. Nearly all had had symptoms of enteritis during the febrile stage of infection and if the child had a febrile relapse this was usually accompanied by recurrence of enteritis. Up till 1939 if any such child had died, and any intestinal symptoms had been given on the death certificate as secondary to the respiratory infection, its death would have been classified by the Registrar-General as due to enteritis under two years of age, which is epidemiologically associated with inferior sanitation.

It is possible that a certain proportion of children with such respiratory infections are only seen in the terminal stages of their illness and that the death is then certified as due to enteritis. Such "minor epidemic waves" occurred not only last spring—and during the present influenzal wave—but in every spring. There are now, in fact, two epidemic peaks, one alimentary in the summer and one respiratory in the winter. As the summer epidemic declined in severity the peak became progressively later and is now often in October when infectious catarrhs or colds are common. During the last two years at Alder Hey Hospital the bacteriological investigation of cases of enteritis, mainly using desoxycholate medium, has shown the following results:

1942 and 1943 quarters	*S. morgani* no. 1	*S. morgani* no. 14	*Shigella schmitzi*	*Sh. sonnei*	*B. pyocyaneus*	Salmonella	*B. typhosus*	*B. carolinensis*	Tota
1st	8	6	1	..	4	3	..	..	22
2nd	9	7	2	1	6	3	..	1	29
3rd	22	25	6	..	11	3	..	..	67
4th	19	13	1	13	12	5	1	3	67
Total	58	51	10	14	33	14	1	4	185

These results were obtained in 1826 specimens from suspected cases (positive specimens, 10·2%).

A further cause of difficulty is the case of children suffering from dietetic errors. If one should die and its death certificate gave the cause as being "infantile dyspepsia," it will be attributed, as I believe, to enteritis under two years of age. Is it not time that the classification of these infantile deaths should again be revised and brought more up to date? What I wish to emphasise is that the residuum of "enteritis" deaths is now a group

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of diverse diseases. There have recently been outbreaks of enteritis of the newborn which are regarded as respiratory infections possibly due to filter-passing organisms. I have had experience of one such outbreak (unpublished as yet) recently in a maternity unit, with 5 deaths in 7 cases. The causal organism was *S. aertrycke*, not improbably derived from mice though we had not the luck to prove this by finding infected mice and infected mouse fæces in a condensed milk tin, as E. R. Jones and H. D. Wright did (*Lancet*, 1936, i, 22). One or more of these deaths were classified by the Registrar-General to enteritis under two years of age, though the epidemiology again was different.

No doubt the classification rules of the Registrar-General were justified in the bad old days and deaths from the prevalent alimentary infection of enteritis were in many cases hidden away under misnomers, although there is reason to believe that many deaths due to this cause escaped his net by being attributed to "convulsions" which brought them into the group of nervous diseases.

Liverpool. C. O. STALLYBRASS.

SIR,—In view of the liver damage frequently found in infants with gastro-enteritis, indicating the presence of some hepatotoxic agent in their system, a therapy aiming at neutralising this poison and re-establishing or actively supporting the natural detoxication mechanism of the body is evidently of first-rate importance. It is a well-known fact that amino-acids, often in interdependence, play a vital rôle in detoxication and recent clinical investigations, although statistically not always satisfactory (Fagin, I. D. and Zinn, F. T. *J. Lab. clin. Med.* 1942, **27**, 1400; Fagin, I. D. Sahyun, M. and Pagel, R. W. *Ibid*, 1943, **28**, 987) showed that intravenous administration of amino-acids (reinforced casein hydrolysate) in patients with cirrhosis of the liver was able to arrest and in many cases reverse the degenerative process in the liver to a remarkable extent. An actual trial of this therapy in infantile gastro-enteritis with apparently excellent results has also been reported (Shohl, A. T. *J. clin. Invest.* 1943, **22**, 257). These findings are encouraging and together with the possibility of rapidly re-establishing nitrogen-retention by amino-acid treatment justify a wider trial of this inexpensive and safe therapy.

Welwyn Garden City. H. RINDERKNECHT.

SIR,—Recent articles stress the advantages of breast-feeding and the importance of aseptic technique in bottle-feeding. A point of nursing routine, which I feel should be emphasised in such cases, is that two pairs of hands are required, one to feed the child and the other to clean and change napkins; and under no circumstances should the same person attend to both ends of the child. I have seen a number of cases in India varying from a mild diarrhœa to a severe dysentery in which neglect of the above precaution resulted in reinfection or protraction of the infection, and I am convinced that it is the first point to insist on whatever other method of treatment is being adopted.

J. GORDON FIFE.

SOCIAL AND PREVENTIVE MEDICINE

SIR,—Under the curious title of "quizzing the physicians" an anonymous Bedside Teacher puts forward in your Christmas number some interesting criticisms of the composition of the Social and Preventive Medicine Committee of the Royal College of Physicians and of its recent interim report. It is unfortunate that he should conceal his identity because I cannot see that he has anything to be ashamed of and I should like to meet him and talk over his ideas. I do not propose to take up here all the points he raises but merely to reply on the question of the committee's composition. Bedside Teacher complains of the absence of clinicians ("especially consultants") from the committee but I should have thought that 4 out of 13 was a fair proportion even if he excludes a whole-time professor with the experience of Prof. A. W. M. Ellis, and that Lord Moran, Dr. H. E. A. Boldero and Prof. J. C. Spence were adequate representatives of this aspect of the subject, even if I leave my own name out and even if recent changes in our existence have temporarily altered our status and broadened our experience. A long training in the "hard school of clinical medicine" and a wide experience in this country and abroad make me differ in some respects from Bedside Teacher but I repeat that I hope he will reveal his identity so that we can meet and talk things over. Before we meet, however, I hope he will have apologised for his slighting and inaccurate reference to the professor of preventive medicine at Harvard as an "American attached to the Ministry of Health."

ALAN MONCRIEFF,
Chairman, Social and Preventive Medicine Committee, Royal College of Physicians of London.

*** We should perhaps state that the anonymous writer was not a fellow or member of the College nor did he suggest the title of the letter.—ED. L.

POSTWAR PÆDIATRICS

SIR,—The *Times* of Dec. 24 had a leading article on the new Education Bill (which involves local authorities in the duty of providing treatment as well as inspection), pointing out the need for improved teaching of children's diseases. I think this need will be most urgent in those doctors who are in the Forces, and wish to take up pædiatrics after the war. Theirs is perhaps the only specialty which must be entirely neglected while they are serving; even the gynæcologists now have plenty of scope.

A feeling is growing among young doctors in the Forces that they will be in need of rehabilitation just as much as other workers, and that the rehabilitation should be provided by the Government. May we hope that when demobilisation begins these facts will not be forgotten, and that adequate courses of instruction in children's diseases will be available?

FLIGHT LIEUTENANT.

STRYCHNINE FOR RODENTS

SIR,—You refer to the value of strychnine as a poison for rats (and incidentally mice) but you observe that although results could be achieved more quickly with strychnine it is a painful and undesirable poison not at present permitted. There is no doubt that it is painful, but whether more so than arsenic or zinc phosphide I have reason to doubt; it is certainly quicker, and therefore perhaps more merciful in its action. Its use as a poison is prohibited probably because of its danger, unless very carefully controlled, to other animals and to birds such as poultry and game. There is, however, one exception; it may be used for the destruction of moles, though why we should be less tender-hearted as regards this (*pace* the farmer) not unpleasant little animal I do not know, except that probably the correct method of using it is devoid of risk.

Strychnine is indeed a valuable rodent poison and I should like to try it out under strictly controlled conditions, since I believe it to be much better than arsenic, barium carbonate and also red squill. A little time ago I found one of my rodent officers using some poisoned rice, which he had obtained indirectly from a South American source, for the destruction of rodents. The results were remarkable and the officer was enthusiastic about this find, but analysis confirmed my suspicion that the poison employed was strychnine. The trouble is that we have as yet no satisfactory alternative poison equal to zinc phosphide; arsenic and barium carbonate are bulky and rats do not take to them so readily, and red squill is fickle in potency. I would urge the authorities to permit the use of strychnine as a rat and mouse poison, if not in rural areas in certain types of premises—e.g., in ships, wharves and warehouses where conditions permit of strict control.

M. T. MORGAN,
MOH, Port of London.

THE RUBIALES

SIR,—Your annotation (Dec. 11 last) on yohimbine suggests that elder is a member of the rubiaceæ. This is incorrect, as it belongs to the caprifoliaceæ, or honeysuckle family. In addition to the useful products of the rubiaceæ mentioned we should not forget coffee, which many folk would doubtless consider of even greater benefit to mankind than cinchona.

Staines County Hospital, Ashford, Mdx. J. K. HASLER.

*** Dr. Hasler is of course correct about the natural order rubiaceæ. It was the series *rubiales* we had in mind, and this includes the elders and the valerians.—ED. L.

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GYNÆCOMASTIA

SIR,—In your article on hypertrophy of the male breast (*Lancet*, March 6, p. 308) you state, "At present all is disorder," and suggest that all knowledge gained of the hormonic factors affecting the breast tissue may eventually contribute to the solution of this problem. Dr. Richardson reported a case in the same issue and suggested that a possible ætiological factor operating to produce gynæcomastia could be an abnormal sensitivity ("vigorous response") of the breast tissue in certain males to the action of œstrogen ("normal endocrine stimulation"). In your issue of March 20 Mr. Levi reported a case of unilateral gynæcomastia in a young man, which, he said, seemed difficult to explain on Dr. Richardson's theory.

I recently examined a colleague who had a gynæcomastia of the right breast removed at the age of 14 years and who, at 58, developed gynæcomastia of the left breast. I have observed the effect of testosterone implants on bilateral gynæcomastia in a 17-year-old eunuchoid in whom I implanted 3 doses of 450 mg. of testosterone at 4-monthly intervals. The total dosage of 1350 mg. completely removed the testosterone-deficiency syndrome of eunuchoidism but produced absolutely no change in the bilateral gynæcomastia. A bilateral mastectomy was performed.

Our next therapeutic approach to the problem has been the injection of 50 mg. of testosterone propionate directly into the breast. Two patients (rejected for military service because of gynæcomastia) have received a series of 4 injections of 50 mg. of testosterone propionate, one at weekly and the other at biweekly intervals. We have observed no beneficial effect on the gynæcomastia with this method, and no untoward local or general reaction.

The breast tissue of the male varies in its sensitivity to œstrogenic stimulation when the same dosage is administered, and in most individuals one breast is usually more sensitive to the administered œstrogen than the other. The right breast is generally the first and in some instances the only breast to react to the administration of œstrogen.

Unequally developed breasts in the female are not uncommon and I have observed unilateral enlarged breast (Hottentot type) in a girl aged 11, and bilateral enlargement (adult size) in a girl aged 7 with a urinary œstrogen excretion normal for their age and absence of other abnormality which would account for the enlarged breasts. I have also lately examined a 14-year-old girl with a normal full-size left breast and no breast development on the right side. The urinary œstrogen excretion was normal. Dr. Parkes Weber in your issue of April 3 cited other variants of breast response in both males and females.

The following clinical evidence is relevant:

1. Methyl testosterone, 10 mg. every third night, had a favourable growth effect in a 9-year-old achondroplasic dwarf, but provoked persistent and annoying erections, even when dosage was much reduced. Ethinyl œstradiol was investigated for its growth in the male and was administered in 0·05 mg. dosage every third day for 3 doses; it had to be discontinued after the third dose because of the development of breast masses and pain in the breasts.
2. Œstradiol benzoate, 6000–10,000 RU in series of 2–4 injections every second to fourth day will control some cases of severe or chronic migraine in males. This dosage has nearly always produced breast development, determined by biopsy to be a true œstrogenic effect on the mammary tissue of the male. In one case the right breast mass had to be excised before therapy could proceed; the left breast did not react. This was a patient with severe migraine who intended suicide because all other therapy (even opiates) had failed to control his disorder.
3. Hypersexual males and sex criminals were treated with stilbœstrol, 1–5 mg. daily for 60 or more days. Ages varied from 12 to 62 years. In each case a definite and well-developed bilateral gynæcomastia was therapeutically induced and could be progressively increased by maintaining dosage; biopsies confirmed the physical findings of gynæcomastia. Urinary bioassay showed that both androgens and anterior pituitary gonadotropin excretions were progressively diminished in titre during stilbœstrol therapy; and œstrogen excretion was increased by the œstrogenic therapy. During the period of well-developed gynæcomastia, when androgen and anterior pituitary gonadotropin excretion were diminished, there was suppression of spermatogenesis, atrophy of the testes and penis, and absence of erection and libido. When therapy was stopped for 2 months spermatogenesis began again and erections and libido returned; the penis enlarged, but there was little change in the size of the testes; involution of the gynæcomastia was almost complete.

Our clinical and therapeutic observations in male gynæcomastia are in agreement with Dr. Richardson's views. Further it is now our opinion that a hypertrophied breast in the male which persists for one year in a male past puberty and which is not associated with testicular or adrenal abnormality should be radically excised without unduly disturbing the cosmetic appearance of the region. At present this procedure will prevent the psychological trauma which persistent gynæcomastia in the male produces and which failures of endocrine therapy have exaggerated.

CHARLES WILLIAM DUNN.

Graduate School of Medicine,
University of Pennsylvania.

THE NURSE IN CHARGE

SIR,—Dr. Smallpeice's proposal that the sick nurse should be permitted to approach the medical officer directly would in practice certainly lead to difficulty, but a few suggestions may help.

In many hospitals there is no fixed hour at which sick staff can be seen. Walking cases are best dealt with in the sick ward at a fixed time daily. Where possible nurses should be under the care of a general physician or surgeon of registrar status, or higher. Clearly nurses on duty cannot leave their wards without the sister's permission, but no obstacle should be placed in the way of those desiring to attend the clinic.

Nurses off duty should be free to attend without formality. The staff ward should be under the care of a widely experienced and sympathetic sister who can herself deal with many minor problems. It is often best to see the nurse alone while taking her history, especially if she is new and nervous, the sister being called in for the physical examination.

Finally, few doctors or nurses should be entrusted with technical details of their own cases.

Botleys, Surrey. JOAH BATES.

COD-LIVER OIL AND VITAMIN E

A non-medical correspondent, having heard a speaker on the wireless warning breeders not to give rabbits too much cod-liver and halibut-liver oil because these may destroy vitamin E, asks whether excessive consumption of such oils may account for some human infertility. It seems that concentrated or synthetic vitamin E is destroyed when it is mixed with cod-liver oil, either within the stomach or outside it. Here the unsaturated fatty acids of the oil oxidise and so destroy the vitamin. But vitamin E in grass, green vegetables, grains, &c., is protected by the anti-oxidants which occur with it in these foodstuffs. Therefore it is impossible to make rabbits deficient in vitamin E unless large amounts of cod-liver oil are given with all their food and their diet is grossly abnormal, containing no green food or other foods rich in vitamin E. Fat itself is badly tolerated by rabbits, which is the main reason for not giving them large quantities of cod-liver oil. In all the animal experiments with vitamin E and cod-liver oil the diets used were so abnormal that they would never be used by rabbit-breeders. Turning to man, the amount of cod-liver oil taken is never enough to have an appreciable effect on vitamin E, and vitamin E in human foods is always protected by anti-oxidants. The interaction only takes place if cod-liver oil and a synthetic or concentrated preparation of vitamin E are taken within two hours of each other; then the two become mixed in the stomach and the vitamin is open to destruction because its protective anti-oxidants have been removed in the concentration process. When liquid paraffin is taken with meals it probably dissolves the vitamin E of the food and the two are excreted together.

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NEW YEAR HONOURS

THE honours lists issued on Jan. 1 and 4 contain the following names of members of the medical profession:

Knights Bachelor

FRANCIS RICHARD FRASER, MD EDIN., FRCP
Director-general of the EMS, and professor of medicine in the University of London at the British Postgraduate Medical School.

WALTER HAWARD, OBE, MB DURH.
Director-general of medical services of the Ministry of Pensions.

Colonel GEORGE WYKEHAM HERON, CMG, CBE, DSO, MRCS
Director of medical services, Palestine.

THOMAS JONES, MRCS, JP
Chairman of the Anglesey education committee.

CB (Military)

Major-General ALEXANDER GORDON BIGGAM, MD EDIN., FRCP, KHP

Major-General CHARLES MAX PAGE, DSO, MS LOND., FRCS

Air-Commodore CHARLES PUTNAM SYMONDS, DM OXFD, FRCP

CIE

Colonel THOMAS CRAWFORD BOYD, FRCSI, IMS
Inspector-General of civil hospitals, UP, India.

Lieut.-Colonel AUGUSTINE SARGOOD FRY, CH M EDIN., FRCSE, IMS
Professor of operative surgery, King Edward Medical College, Lahore.

Lieut.-Colonel ARTHUR DENHAM WHITE, MB LOND., FRCSE, IMS retd., Bengal.

CVO

FRANCIS HUGO TEALE, MD LOND., FRCP

CBE (Military)

Brigadier BASIL CEDRIC ASHTON, MB EDIN., IMS, KHS

Group-Captain LANCELOT MILLER CORBET, MB MELB., RAFRO

Colonel FREDERICK HARRIS, MC, MB DUBL., RAMC

Surgeon Captain HENRY BRICE PARKER, D SC, MB LOND., RN retd.

CBE (Civil)

CHARLES HERBERT BEST, MD LOND., FRS
Professor of physiology in the University of Toronto.

WILLIAM LESLIE BURGESS, MD EDIN., FRCPE
Medical officer of health for Dundee.

GEORGE LISSANT COX, MD CAMB.
Chief tuberculosis officer for Lancs.

ALAN NIGEL DRURY, MD CAMB., FRS
Lately member of the scientific staff of the Medical Research Council.

DUNCAN GRAHAM, MD TORONTO, FRCP
Dean of the faculty of medicine and professor of medicine in the University of Toronto.

SYDNEY ALFRED SMITH, MD EDIN., FRCPE
Chairman of the Scottish Central Medical War Committee, and regius professor of forensic medicine in the University of Edinburgh.

CLAUDE EDWARD TANGYE, MD LOND.
Medical officer of health for Wilts.

Colonel MAURICE LAWRENCE TRESTON, FRCS, FRCOG, IMS
Inspector-General of civil hospitals, Burma.

OBE (Military)

Lieut.-Colonel GUY PASCOE CROWDEN, D SC LOND., MRCP, RAMC TA

Group-Captain CECIL WOOD FLEMMING, DM, M CH OXFD, FRCS, RAFVR

Surgeon Commander ROBERT WILLIAM HIGGINS, MB NUI, RN

Squadron-Leader JOHN EDWARD GEORGE MCGIBBON, MB LOND., DLO, AAF

Squadron-Leader EDGAR ALEXANDER PASK, MB CAMB., RAFVR

Lieut.-Colonel JAMES MACLURE SMELLIE, MD EDIN., FRCP, RAMC TA

Lieut.-Colonel PAUL ALFRED TURNER SNEATH, MB TORONTO, RCAMC.

OBE (Civil)

THOMAS RICHARD WEBSTER ATKINS, LRCPE
Ship's surgeon, MN

Lady (MARGARET WILKIE) BHORE, MB ST. AND.

FRANK SEBASTIAN COOKSEY, MD LOND.
MO rehabilitation department, Horton EMS Hospital.

PETER PAUL DEBONO, MD MALTA, FRCS
Professor of surgery in the University of Malta.

(Mrs.) MARTHA ISABEL GARVICE, MBE
Senior lady medical officer, Egyptian Ministry of Education.

JOSEPH RICHARD GREGORY, MD DUBL.
Director of the Kenya branch of the British Red Cross.

GEORGE MCFEAT, MB GLASG.
For public services in Lanarkshire.

JOHN CHANCELLOR MCKENZIE, MB GLASG.
Commissioner of medical services of the Ministry of Pensions for Scotland.

EDWARD LOGGIE MIDDLETON, MD EDIN.
HM medical inspector of factories.

WILLIAM JOHN RICHARD, MB GLASG., FRFPS
Medical superintendent Law EMS Hospital, Carluke.

CHARLES MERILL SCHAFFTER, MB EDIN., FRCSE
Surgeon to Church Missionary hospitals in Persia.

HAROLD EDWARD SKEETE, MD
For public service in the Barbados.

LEONARD ANTHONY PAUL SLINGER, MB CAMB.
Resident surgeon at the Victoria Hospital, St. Lucia.

JANET MARIA VAUGHAN, DM OXFD, FRCP
Organiser of the RN blood transfusion service centre.

MBE (Military)

Major CLARENCE MELVILLE BETHUNE, MD DALHOUSIE, RCAMC

Major JOHN WEIGHTMAN BRIDGE, MD ALBERTA, RCAMC

Captain RICHARD JAMES CAIRNS, MB GLASG., RAMC

Major ALFRED LEONARD CRADDOCK, MB LOND., Burma Army.

Captain ERIC RUDOLPH HILL, IAMC

Major T. MILLER, RCAMC

Captain FRANCIS LESLIE POTTER, MRCS, RAMC

Major CHARLES MARTIN ROW, MRCS, RAMC

MBE (Civil)

RATNAKAR NARAYAN BHAINDARKAR, MB
ARP warden for Dadar west division, Bombay.

(Mrs.) HARRIETT MINNIE LEVICK, MD LOND.
Organiser WVS for civil defence, Middlesbrough.

DAVID JAMES MASTERTON MACKENZIE, MB EDIN.
Acting principal medical officer, Bechuanaland.

MOHAMMED ALI RANA, MRCS
For public services in Kenya.

GERALD EARL THORNTON, MB OXFD
Chairman, Air Training Corps committee, Salisbury.

AFC

Wing-Commander JAMES PROCTER HUINS, OBE, MRCS, AAF

Wing-Commander HUGH PATRICK RUFFELL SMITH, MB CAMB., RAFRO

Kaisar-i-Hind Medal

Lieut.-Colonel BASIL FRANKLIN EMINSON, MB LOND., IMS retd.
Civil surgeon, Karachi, Sind.

Major REGINALD ARTHUR HAYTHORNTHWAITE, BM OXFD, IMS
Civil surgeon, Khasi and Jantia Hills, Assam.

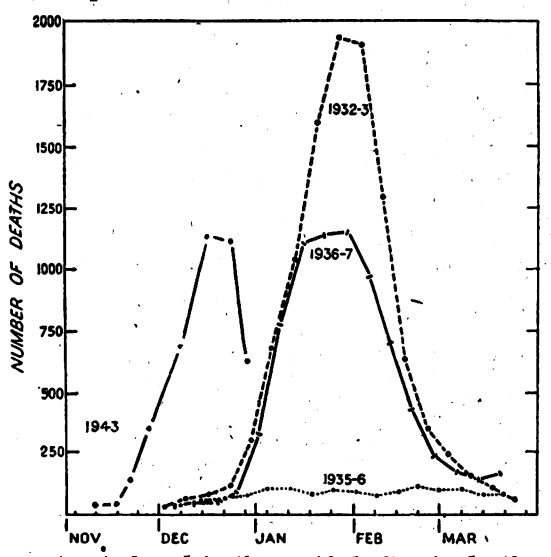
JOHN LOWE, MD BIRM.
Coördinator of research, School of Tropical Medicine, Calcutta.

(Miss) JEAN MURRAY ORKNEY, MB ST. AND.
Director of maternity and child welfare bureau, India Red Cross Society, New Delhi.

Public Health

The Influenza Epidemic

THE curve of weekly deaths from influenza in the great towns of England and Wales speaks for itself. It conforms closely to the pattern of 1932–33 when the remission was rapid and uneventful. Some towns, however,



have not yet shared in the rapid decline in deaths, including Sheffield (25), Liverpool (24), Bournemouth (15) and Croydon (13).

Comparatively little is yet known about the epidemic in other countries. The broadcast figures for the estimated incidence in Washington, Milan and Berlin, which we quoted on Dec. 25, were not issued by the Ministry of Health.

Child Guidance in London

The London County Council, though interested in child guidance since 1928, have been cautious in its policy towards it. Their education committee have now reviewed [1] the work undertaken by child-guidance

1. LCC Education Committee. Report adopted on Dec. 1.

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clinics in London and studied the experience of other local education authorities. They feel that any new developments should be made in close association with, or even as an integral part of, the school medical service. The present clinics, many of which are voluntary organisations, have children referred to them not only through school care-committees, organisers, doctors and head teachers, but in addition from family doctors, probation officers, clergymen, parents and friends. As a result a wide range of conditions is regarded as suitable for treatment. When, in 1928, the LCC accepted the offer of the Child Guidance Council to open the first clinic in London it was agreed that the children to be treated should be selected by the school medical officer, and in reviewing the subject the education committee have concluded that the LCC should recognise for grants or payments only children referred through the school organisation on the authority of the school MO.

To distinguish better the types of children suitable for child guidance from those who can be treated equally well by the Council's other medical and mental health services, it has been decided to set up, in each of the nine education administrative divisions, a small standing case conference of LCC officers. The regular members of each of these conferences would be a school inspector, a medical officer, an organiser or assistant organiser of school care-committees, and a special inquiry officer or other representative of the divisional officer. Teachers and officers will be able to refer cases to this conference or to consult them personally on educational and social difficulties relating to children. Thus they could consult the conference about children needing special schools or those coming from bad homes who needed statutory care, as well as those needing help from a child guidance clinic. The conference would be able to deal with many cases by advice or by suggesting the appropriate official help. Other people and bodies likely to find the conference helpful over cases would be divisional officers, school doctors and nurses, school inquiry officers, social welfare workers, probation and NSPCC officers, club leaders and voluntary social workers. The conferences would thus coördinate much of the special children's case work at present diffused in different administrative sections of the LCC.

Magistrates of juvenile courts often ask that a delinquent child should be referred to a child-guidance clinic, or make it a condition when placing him on probation. The committee feel that in the case of any child for whose maintenance or care the LCC may become liable the courts should be advised to convey their views on psychological treatment to the Council's medical officer. Only when he considered a case suitable for such treatment could the Council accept liability for the cost.

Infectious Disease in England and Wales

WEEK ENDED DEC. 25

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 1786; whooping-cough, 1244; diphtheria, 498; paratyphoid, 1; typhoid, 2; measles (excluding rubella), 363; pneumonia (primary or influenzal), 2079 (last week 2841); puerperal pyrexia, 105; cerebrospinal fever, 53; poliomyelitis, 5; polio-encephalitis, 3; encephalitis lethargica, 2; dysentery, 96; ophthalmia neonatorum, 66. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Dec. 22 was 1754. During the previous week the following cases were admitted: scarlet fever, 98; diphtheria, 42; measles, 18; whooping-cough, 62.

Deaths.—In 126 great towns there were no deaths from enteric fever, 1 (0) from scarlet fever, 1 (1) from measles, 17 (4) from whooping-cough, 9 (0) from diphtheria, 43 (2) from diarrhœa and enteritis under two years, and 690 (80) from influenza. The figures in parentheses are those for London itself.

Birmingham reported 8 deaths from diarrhœa.

The number of stillbirths notified during the week was 185 (corresponding to a rate of 32 per thousand total births), including 19 in London.

Obituary

GEORGE CRANSTON ANDERSON

CBE, MD EDIN, LLD, FRCP

Dr. G. C. Anderson died in London on New Year's evening, after an illness following a heart attack in October. For 24 years he had been on the secretariat of the British Medical Association, and he succeeded Dr. Alfred Cox as medical secretary in 1932. Son of a Congregational minister he was born in Wisconsin, and educated at Bradford Grammar School, Dundee High School and Edinburgh University, where he qualified in 1904, after establishing a sound athletic record. After a house-surgeoncy at Wakefield, his leaning towards surgery was frustrated by lack of opportunity and he settled in general practice in Fife where he soon found scope for his real interest in medical politics.

Press Portrait Bureau

On return from two years' service in the Middle East in 1917–19, he became deputy medical secretary at BMA headquarters and was soon recognised as a capable organiser, with a frank and attractive manner, and an overriding willingness to help any honest inquirer; and as time went on he dropped naturally into the position of friend and adviser to all and sundry. In 1936 he was commissioned by BMA council to visit India and report on the conditions of medical practice and organisation there; the document contains suggestions which may still bear fruit. When in 1939 the War Office for the second time entrusted the medical profession with its own mobilisation, Dr. Anderson became its scribe and record keeper; but this onerous duty did not stand in the way of his continuing to play an active part in the discussion on medical planning. The address he gave in the autumn of 1943 to mass meetings of medical men and women at four centres revealed a gift of subordinating specious detail to important principles. We should, he insisted, have a clear conception of the kind of administration we want; unless the foundations are sound, the whole of the medical services will be jeopardised. The principle of vocational advice was inviolate, but while he preferred government by a corporate body, he was content to try to persuade Parliament to accept that view. Recognising the principle of free choice of doctor, he could yet observe that the patient will not time his illness to coincide with the doctor's hours of duty. As we have had no experience of salaries in general practice we ought not to fear to experiment with them at health centres. He was willing to examine the coming white-paper in a broad and reasoning spirit; social development cannot be halted and he was convinced that there must be change—but development must follow the line which the doctor believes to be in the best interest of the patient and in closest harmony with modern democratic ideas.

That was Anderson's thesis, and it was well and truly worked out in his life. He was in his 65th year.

ROBERT OWEN MORRIS

OBE, M D EDIN, D P H, F R S E

Wales has lost a beloved doctor and an accomplished public servant by the death on Nov. 30 of Dr. R. Owen Morris at the age of 84. The Welsh National Memorial Association will long recall his wise and genial presence and his contributions to the epidemiology and treatment of tuberculosis. Morris was born at Portmadoc, the son of a sea captain who was lost on a voyage to Norway when his son was seven years old. His mother, as he testified, brought him up well but strictly. He got his first lessons in a dame's school where a fellow pupil was Robert Armstrong-Jones. Then he began his career as a shop-assistant at Pwllheli, but soon entered the ministry and was ordained pastor

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of a Presbyterian church in Montgomeryshire. He gave up his pulpit to study medicine at Edinburgh where he had already graduated in arts in 1886. He took his medical degree in 1894 and settled in Birkenhead where he was appointed medical officer to the school board. As a citizen he also served the borough, for he was a member of the council for 13 years, mayor during 1902–03, and a justice of the peace. Nearness to the Welsh border and friendship with Lord Davies drew him into the work of the Memorial Association when it was started, and in 1911 he and Marcus Paterson were appointed its first physicians. Morris became tuberculosis physician of Montgomery in 1914, and parts of Radnor, Brecon and Merioneth were later added to his charge. He was also appointed director of the association's education campaign, and when the Machynlleth Hospital was opened he became the first superintendent. He was a governor of the University College of Wales.

Dr. FRANCIS BARKER, who died on Nov. 25 at Berkhamsted, was a man of fine physique and high intellectual capacity. A member of a well-known Scottish family, he graduated in arts at the University of Glasgow in 1890 and in medicine five years later. He specialised in gynæcology and obstetrics and served the Hospital of SS John and Elizabeth in London as gynæcological physician as well as medical superintendent for many years. At the outbreak of this war he took charge of the EMS hospital at Ashridge Park and worked there till his health failed. Possessed of strong views and forcible personality he was loyalty itself to his friends and to what he held to be right. He was well read and intensely musical, with a charming singing voice. As a young man he was in the tournament class of lawn-tennis players, and he was also a good golfer. He leaves a widow and a daughter.

V. B.

Notes and News

PAINT FOR PERSPECTIVE

THE practice of painting machines in light contrasting colours is only just beginning to find favour in England. It was developed in America in 1941. Factory machines, ceilings and walls are painted in colours which reflect the light. Machine bodies are painted grey with the working parts in light buff so that the danger points are spot-lighted and the operators see their work in three dimensions. This not only increases greatly the value of the available lighting, but reduces accidents because the worker is able to see exactly what he is about. The *Industrial Bulletin* (June–August, 1943, p. 19) describes an experiment in a war factory. The concrete floor was finished in grey paint with a reflection value of 60%; this increased illumination and made scattered tools so obvious that the workers automatically became tidier with them, and there were fewer stumbles over dropped objects. Benches along the assembly line in an aircraft factory were painted in light colours, with saving of light, and in another factory sewing machines were painted soft green, and tables cream, with an increase of illumination at the needles of more than 100%. It was estimated that from every watt consumed it is possible to get double the quantity of usable light now obtained in factories not painted on these lines.

EXPLAINING HEALTH TO THE YOUNG

HEALTH is a trifle hackneyed to those of us who have been talking of nothing else for most of our working lives, and it is hard to remember that it comes as a reasonably fresh topic to the adolescent young. The Board of Education has republished a revised version of some notes [1] on health for the use of leaders of youth groups. Dr. Anna Broman, who is responsible for them, is an old hand at putting facts pleasantly and her approaches are chosen to suit different audiences. Thus boys are invited to compare the needs of the body with those of a car, while girls are reminded of the sleekness of a well-treated dog or pony. There are memorable little sentences here and there: "Sunlight can be called a 'food-stuff'"; "If . . . you 'look after the week,' the week-end will look after itself"; "Don't look down upon cooking"; "The quality of your day's work often depends on your night's rest." The facts presented are simple and adequate and the little volume is apt for its purpose.

1. Simple Health Hints. Anna Broman, MRCS, with a foreword by G. A. Anden, MD, FRCP. HMSO. 3*d*.

FURTHER NURSING PROPOSALS

NURSING will not sink into a decline for lack of advisers—medical, nursing and lay. The second Rushcliffe report has been followed by a report of the equivalent Scottish committee under Prof. T. M. Taylor, which recommends an increase in the salaries of mental hospital nurses. The suggested scales will mean a rise of 4*s*. or 5*s*. a week to all nurses in the service. Like the Rushcliffe committee, the Scottish body followed the custom of discriminating between the sexes by offering 11*s*. a week more to men.

During the same week the Reconstruction Committee of the Royal College of Nursing, under the chairmanship of Lord Horder, has presented the second and third sections of its report to the Minister of Health. These sections, dealing with education and training of nurses, and their recruitment, show a wise sense of contemporary trends in education and remuneration.

"THERE WAS NO YESTERDAY"

A PARATYPHOID epidemic in a small Welsh town is the central theme of John Stuart Arey's new novel (Eyre and Spottiswoode. Pp. 208. 9*s*.), and he manages to explain quite a lot of epidemiology in the intervals of handling a formidable cast of characters. Evans, the elderly GP, knows paratyphoid by the look of it. His daughter and a newly qualified friend find the organism for him, thus discomfiting the local MOH, a born pooh-pooher Arey seems to take a discouraged view of the MOH; of the local big-wig and bun-maker; and of the bun-maker's daughter whose thoughts turn chiefly on matrimony. He still has the weakness, noted in *Night Work*, of being less than fair to those he dislikes; but he has the same strengths too. His offhand style holds fast the attention, his scenes flash into the mind with smell and colour, his conversations (except for an unconvincing one between the bun-maker and his child) mean a little more than the people say, like real conversations. The clinical incidents in the book are very well done; but even the medical reader will lay the book down feeling that he will never again be at ease with a cream-bun.

BREATHLESS DRESSING

THE Central Council for Health Education has produced more wise leaflets on the art of keeping well. "*Right Dress*" *for Health* offers some hints, sound in principle, on making old clothes warmer. Is it not possible to put linings made from old vests into coats, and to cut slit pockets and line them with odds and ends? The answer is—yes, if every housewife had a forty-eight hour day and only her ordinary household tasks to perform. These ingenious repairs and renovations take more time than straightforward dressmaking; and time, like everything else, is in short supply just now. But the reminder is timely that two or three even threadbare garments are warmer than one, while an old shrunk pullover can be worn under a shirt or blouse; and the suggestion that old stockings can be cut up to wear under gloves is sensible.

University of Oxford

In a congregation held on Dec. 18 the following degrees were conferred:

DM—P. M. F. Bishop.

BM—J. M. Hastings, A. I. M. Neill, W. B. Jack, R. H. M. Baines, J. V. Garrett, S. J. G. Spencer, R. W. Fynn, B. I. Johnson, John Evans, D. W. K. Kay, F. J. Flint, W. L. B. Leese, G. I. M. Swyer, J. L. Insley, I. R. Stillman, and Marcia I. P. Harvey.

University of Sheffield

At recent examinations the following were successful:

FINAL EXAMINATION FOR DEGREES OF MB, CHB

Parts II and III.—R. H. Canter, B. S. Crawford, Robert Ellison, Harry Hardy, Margaret S. Hunt, L. A. Storer and Helen M. H. Twidle.

University of Bristol

At recent examinations the following were successful:

ChM.—Marjorie O. Dunster.

FINAL EXAMINATION FOR DEGREES OF MB, CHB

Rukmini L. Ashley, Janet Baker, C. K. Bridge, Margaret P. Drew, John Eskell, E. C. Hamlyn, Beryl M. Hinckley, P. A. James, Ronald Maggs, Margaret Pardoe, Marjorie J. Williams; and (in group I completing) Elizabeth N. R. Wilson.

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Epsom College

The council will in March award a France pension of at least £30 per annum to a necessitous medical man, fully 55 years of age, who has been registered for 5 years. Forms of application may be had from the secretary's office, Epsom College, Surrey, and must be returned by the morning of Jan. 31.

Medical Research Council of Ireland

The council have awarded whole-time fellowships to the following to undertake investigations on the subjects indicated: Dr. V. C. BARRY (chemotherapy of tuberculosis), Dr. MICHAEL FLYNN (the typhoid-carrier condition), Dr. P. A. MCNALLY (chemotherapy of tuberculosis), and Dr. DERMOT MURPHY (production of penicillin). The following have been awarded grants-in-aid: Dr. Bryan Alton, Prof. T. W. T. Dillon, Prof. W. J. E. Jessop, Dr. A. G. G. Leonard, and the following have had their grants renewed: Prof. R. A. Q. O'Meara, Mr. P. J. Boyle, Dr. Oliver FitzGerald, Mr. D. J. Hingerty, Dr. D. K. O'Donovan and Miss E. O'Donovan.

Medical Casualties

The following casualties among RAMC officers have lately been announced.

Killed.—Captain Victor Louis Cooper, MB LPOOL.

Wounded.—Captain D. J. Fraser, MB ABERD., Captain M. I. Robinson, MB BELF.

Medical Honours

The following awards to medical officers have lately been announced:

CBE—Major-General J. G. Gill, DSO, OBE, MC, MB EDIN., late RAMC.

DSO—Lieut.-Colonel P. R. Wheatley, FRCS, RAMC.

OBE—Colonel W. H. A. D. Sutton, LRCPE, RAMC.

MBE—Major M. S. Boparai, MB, IMS; and Flight-Lieutenant S. T. Winter, MB LEEDS, RAFVR.

MC—Major J. B. McEwen, MB GLASG., RAMC; Captain Guy Rigby-Jones, MB CAMB, RAMC; and Captain John Rutherford, MB EDIN., RAMC.

RNVR Officers Decoration—Surgeon Lieut.-Commander R. G. Reid, MB; and Surgeon Commander E. G. Thomas, MRCP.

The MBE has been awarded to Surgeon Lieutenant J. R. Ellis, RNVR, for distinguished services in connexion with the operations which led to the capture of Sicily; to Surgeon Lieutenant A. A. McC. Miller, MB BELF., RNVR, for services to the wounded after an air attack; and to Surgeon Lieut. G. D. Taylor, MB ST. AND., RNVR, for services to the injured after an explosion at sea. Surgeon Lieut.-Commander J. D. Lendrum, MB MANC., RNVR, has been mentioned in despatches.

Wing-Commander C. C. Barker, MB EDIN., RAF, has been commended for valuable service in the air.

Medical Films in Bristol

From time to time the Bristol Public Health Department arranges for doctors the showing of films of medical interest. The next programme will be held at the Odeon Theatre, Broadmead, Bristol on Sunday, Feb. 6, at 10.45 AM. Among the items to be shown are "Mass Radiography" and recently made films on head lice, tuberculosis, nutrition and mass catering. Details from the Medical Officer of Health, Kenwith Lodge, Bristol 6.

Pharmaceutical Society of Great Britain

At 7 PM, on Thursday, Jan. 13, at 17, Bloomsbury Square, London, W.C.1, the Hanbury medal will be presented to Sir Henry Dale, PRS, who will afterwards give an address on the natural history and chemistry of drugs.

Royal African Society

On Thursday, Jan. 20, at Livingstone Hall, Broadway, S.W.1, at 1.30 PM, Dame Katherine Jones, Army matron-in-chief, will speak on war hospitals in Africa.

Association of Clinical Pathologists

The seventeenth annual general meeting will be held at Guy's Hospital, at 9.15 AM, on Friday, Jan. 28, and continue on Saturday, Jan. 29, under the presidency of Dr. A. F. Sladden. Further information may be had from the hon. secretary, Dr. W. H. McMenemey, the Royal Infirmary, Worcester.

Association of Industrial Medical Officers

A business meeting will be held at 11 AM on Jan. 22 at the London School of Hygiene, Keppel Street, W.C.1. In the afternoon Mr. R. M. Handfield-Jones and Mr. P. H. Jayes will open a discussion on injuries and infections of the hand.

Tuberculosis Association

At 26, Portland Place, London, W.1, on Friday, Jan. 21, at 3.15 PM, Mr. J. E. H. Roberts will give his presidential address on a surgical view of timing. Afterwards Dr. A. D. Lapp will speak on the local application of 'Promanide,' Dr. Lloyd Rusby on tuberculosis of the lungs and larynx, and Dr. Brian Thompson on the examination of tuberculosis contacts.

USSR and ASMC

Pleasant New Year cables have been exchanged between medical workers of the Soviet Union and the Anglo-Soviet Medical Council. The Soviet cable, signed by Prof. Nikolay Semashko, chairman of the medical section of the Society for Cultural Relations with Foreign Countries, warmly mentions the work of the ASCM in fostering friendship between our countries. Sir Alfred Webb-Johnson, replying on behalf of the council, looks forward to the time when we can exchange visits with our Russian colleagues, and hopes for a freer exchange of publications in the coming year.

Faculty of Radiologists

The radiotherapy section will meet on Saturday, Jan. 22, at 10 AM at 32, Welbeck Street, London, W.1 to discuss the indications for and effects of irradiation of the pituitary gland. The opening speakers are to be Major Edgar Kahn, USAMC, Dr. A. C. Crooke, and Wing-Commander J. F. Bromley.

The Medical Society of London is holding a pathological meeting at 11, Chandos Street, W.1, on Monday, Jan. 10, at 3.30 PM.

Appointments

HENNESSEY, R. S. F., MD DUBL., MRCPI, DTM & H: deputy director of laboratories, dept. of health, Palestine.

LAWRENCE, ABRAHAM, MB EDIN.: asst. MOH and RMO at Isolation Hospital, Ilford.

*MORRIS, D., MB: temp. asst. MOH for Wembley.

TURTLE, JAMES, MRCS: examining factory surgeon for Margate, Kent.

WASE-BAILEY, B. N. V., MD EDIN., DTM & H, DPH: CMO, Sierra Leone.

WILSON, J. H., MB EDIN., FRCSE: senior RSO at the Southern General Hospital, Glasgow.

* Subject to confirmation.

Births, Marriages and Deaths

BIRTHS

CATLIN.—On Dec. 18, at Worcester, the wife of Dr. C. H. Catlin—a daughter.

LEWES.—On Dec. 25, at Southend, the wife of Dr. David S. Lewes—a daughter.

MACMILLAN.—On Dec. 23, at Toronto, the wife of Surgeon Lieutenant R. L. Macmillan—a daughter.

MOWAT.—On Dec. 17, the wife of Mr. Allan Mowat, FRCSE, of Mulago, Kampala, Uganda—a daughter.

SHAWYER.—On Dec. 22, at Woking, the wife of Dr. R. A. Shawyer, of Guildford—a son.

STAMP.—On Dec. 15, at Evanston, Illinois, U.S.A., the wife of Lord Stamp of Shortlands, MB—a son.

VANREENEN.—On Sept. 25, at Lucknow, India, the wife of Major R. M. Vanreenen, IAMC—a daughter.

DEATHS

ANDERSON.—On Jan. 1, in London, George Cranston Anderson, CBE, LLD, MD EDIN., FRCP.

COURTNEY.—On Dec. 30, at Teignmouth, Devon, Guy Budd Courtney, MD CAMB., DPH, aged 80.

DOUGLAS.—On Dec. 28, at St. Andrews, Charles Edward Douglas, LL.D., MD EDIN., FRCSE, aged 88.

GREGORY.—On Dec. 25, at Oxford, Martha Kirkland Gregory, MB NZ., DO.

KEELE.—On Dec. 30, Keith Stephen Keele, MA OXFD., MRCS, LDS, of Edinburgh, aged 43.

KIRKBY-GOMES.—On Nov. 22, in Hong-Kong, Sidney Gerald Kirkby-Gomes, FRCSE.

LISTER.—On Dec. 21, at Inchbrook, Stroud, Glos., Alfred Ernest John Lister MB LOND., FRCS, lieut-colonel IMS retd.

MARTIN.—On Dec. 26, at Watford, Frank Beauchamp Martin, MB MELB., FRCS.

SYMONDS.—On Dec. 26, at George, Cape Province, Henry Symonds, MD LOND.

WARDEN.—On Oct. 7, at Cannes, France, Archibald Adam Warden, MD GLASG., MD PARIS.

WILKES.—On Dec. 29, Alfred Burton Wilkes, MD, McGill, late major RAMC.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export.

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FEB 15 1944

HAND INFECTIONS TREATED WITH PENICILLIN

M. E. FLOREY
M B ADELAIDE

ROBERT E. O. WILLIAMS
M B, B SC LOND

(*Medical Research Council Unit, Birmingham Accident Hospital*)

THE choice of method of using penicillin is at present largely conditioned by very short supplies, a state of affairs which is likely to continue for a long time. There can be little doubt that the best way of attacking susceptible pyogenic organisms with penicillin is to bring it to the infected tissues by the blood-stream. This, however, demands a great expenditure of penicillin compared with that necessary for local application.

It has already been shown that chronic pyogenic infections can be successfully treated by appropriate local application, and a few more acute suppurative lesions have been treated with good results (Florey and Florey 1943). Clark, Colebrook and others (1943) and Bodenham (1943) have shown that pyogenic cocci can be removed from infected burns. Pulvertaft (1943) has demonstrated that some chronically infected war wounds can be freed from streptococci and staphylococci by local application.

It appeared desirable to ascertain more fully the possibilities of using penicillin in acute pyogenic infections. Acute infections of the hand were chosen, because they are common in industry and cause much permanent disability, or at best considerable loss of working time. The number of cases available allowed a comparison between those treated with penicillin and those treated by routine methods. The complicated structure of the hand permitted observation of the effects of penicillin application on skin, areolar tissue, blood-vessels, nerves, muscles, tendons, synovial membranes of tendon sheaths and joints, and bone. The results of healing of wounds have in the last analysis to be judged by return of function, and the hand afforded an admirable structure for observations on this important point.

Special attention was paid to: (1) the arrest of sepsis and bacterial infection; (2) the after-effects attributable to arrest or persistence of sepsis; and, in the penicillin cases, (3) possible deleterious effects of the drug; and (4) the most suitable methods of administration.

METHOD OF INVESTIGATION

The cases were grouped according to the site of the infection.

Group	No. of cases in: "control" series	penicillin series
1. Paronychia	26	26
2. Pulp infection	27	28
3. Web-space infection	9	9
4. Tendon-sheath infection	11	11
5. Miscellaneous abscesses	12	12
6. Septic lacerations	5	6
7. Miscellaneous lesions	12	18
	102	110

Throughout this paper "series" will refer to the two major classes, "control" and "penicillin-treated." "Group" will refer to both control and treated cases in one clinical class—e.g., pulp infection.

To eliminate personal bias alternate cases were taken for penicillin treatment, although, as will be seen, this was not entirely satisfactory when dealing with small numbers. Observations were made at operation and thereafter daily on both series in the acute phase, and afterwards not less than twice a week till healing was well advanced. The investigation was not considered complete till full function had been regained or till a sufficient period had elapsed to make this unlikely—i.e., up to 6 months from operation.

The duration of expectant treatment and the choice of site and method of approach at operation were in the hands of the surgeons, the same team operating on both series of patients. The postoperative care of outpatients of both series was left in the hands of one investigator, but inpatients remained under the full charge of the hospital staff, only the dressings of the penicillin-treated patients being done by the investigator.

It is necessary here to define the term "controls." Though the surgical methods were the same in both series (except for 3 patients in group 5), the patients of the "control" series received various local applications and some of them were given sulphonamides by mouth at various stages. They were not controls in the sense of receiving treatment in every particular the same except for the administration of the drug. They might better be called "contrasts," since the results of penicillin treatment were contrasted with the results of the various method accepted at the present time.

TREATMENT

Local applications.—For the purpose of the investigation, treatment was considered to start at the time of operation. Controls were packed with paraffin gauze at operation and later with eusol preparations. Inpatients were given saline baths in which they were encouraged to move the hand. As the wounds became superficial, sulphanilamide powder, sulphathiazole cream, or gentian violet and sulphanilamide were sometimes applied. Dressings were carried out once or twice every 24 hours, according to the amount of discharge, till wounds were far advanced towards healing.

The penicillin-treated wounds were powdered evenly at operation with the calcium salt of penicillin and packed with gauze soaked in penicillin paste (lanette wax 12 parts, arachis oil 25 parts, water 55 parts, with penicillin added to make a strength of 150 or 250 units per c.cm. prepared as recommended by Clark and others (1943). A layer of fine-mesh soft-paraffin gauze was placed over the wound to prevent the drug soaking out into the dressings. Treatment with penicillin at the time of operation was considered essential, because far better access to the infected parts could be gained then than at subsequent dressings. A bloodless field was obtained by means of a sphygmomanometer cuff, to facilitate application of the powder. Dressings were repeated every 24 hours for a minimum of 5 days. In 3 cases surgical procedure was adapted to the use of a penicillin solution instead of the paste. In the absence of slough, and where access to infected tissues at the first operation had been adequate, penicillin treatment was not continued after the end of the first week, except for a light dusting of penicillin as a preventive against further infection when the dressing was changed. Further dressings were seldom necessary after the first week except for readjustment or for purposes of observation.

Other treatment.—Sulphonamides by mouth were used in the more severe control cases but only in 3 of the penicillin series, where 16 g. was the largest amount given. Rest in bed and local heat were ordered on occasion, irrespective of the series. After the 5th day the patients were taught to move the joints and encouraged to do so, provided that no exacerbation of infection followed.

Attention was paid to factors liable to influence the prognosis, such as age, sex, severity and extent of lesion, type of tissue involved and amount of destruction, duration of sepsis and of expectant treatment, concomitant disease, and nature of the infecting organism. An attempt was made to assess these factors. They have been disregarded in the groups where they appeared to equalise one another but they are discussed in the groups where they differed widely.

ASSESSMENT OF RESULTS

Bacteriological examinations.—In the great majority of cases the infecting organisms were either Lancefield's group A streptococci (referred to throughout as "*Strep. pyogenes*"), coagulase-positive staphylococci (referred to as "*Staph. aureus*"), or both. The tabulated results refer to infection by these organisms. The few results with infections by other species—e.g., micrococci, hæmolytic streptococci other than groups A, B, C or G (referred to as "hæmolytic streptococci") and coliform bacteria, are dealt with in the text.

The following criteria were adopted in classifying changes in the degree or type of infection.

Persistence of infection: continuous series of heavy or moderate growths from swabs.

Diminution of infection: reduction of the growth of infecting organisms on a direct plate from the swab to less than 20 colonies.

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Reinfection: reappearance of growth after at least two successive negative swabs.

Swabs for bacteriological examination were taken at operation, and thereafter, for reasons of convenience, twice a week on fixed days from inpatients and once a week from outpatients, till healing had taken place or the wound was many weeks old. A swab might therefore be taken on any day from the 1st to the 5th after operation, but for purposes of this comparison "second swab" refers to that taken on or after the 5th day. The changes in growth in the group tables refer to swabs taken up to and including the 8th day.

Arrest of sepsis and bacterial infection.—In open wounds a simple check on the arrest of sepsis was provided by the results of the bacteriological examinations, which were considered therapeutically satisfactory if there was a disappearance or diminution of the infecting organisms. Clinically, the loss of pain, redness, swelling, fever and pus formation were all taken into account, but for purposes of statistical comparison the disappearance of pus was found to be the most satisfactory. Pain was subject to emotional influences, redness of the skin in controls was sometimes obscured by soaking, swelling due to inflammatory œdema of the tissues merged insensibly in the longer lasting control infections into a firm thickening, obscuring the time limit of active inflammation, while pyrexia was present in only a few cases. That disappearance of pus is not due to an inhibitory action of penicillin on leucocytic activity has been shown experimentally (Abraham et al. 1941) and clinically by its continued formation during penicillin administration in the presence of coliform organisms. In the tables "drying" indicates the time when a scab had formed. When patients were not seen daily, drying was considered to have taken place half way between the two last days of observation.

After-effects of arrest or persistence of infection.—Spread of infection, appearance of granulations and epithelial ingrowth, separation of sloughs, return of movement, loss of digits and time of healing were all studied. Particular attention was directed to the most essential criterion of success—recovery of function. As will be seen, the various clinical groups brought out different aspects of the comparison between control and penicillin-treated cases. In all groups except paronychias, where healing involved little beside the growth of epithelium, the healing process took an obviously different course in the control and penicillin-treated series. For this reason the time of healing under the conditions imposed by current surgery was by no means a criterion of the arrest of sepsis.

Experience with Various Lesions

PARONYCHIA

This group (table I) included infections by *Staph. aureus* and *Strep. pyogenes*, both separately and combined. It comprised infections which had already lasted from one day to six weeks. Expectant treatment in the shape of sodium sulphate compresses and splinting with plaster had been carried out in half of each series. Other factors affecting the prognosis also appeared to be equal.

TABLE I—PARONYCHIA: ARREST OF SEPSIS AND RECOVERY

—	Bacteriological findings: number of cases										Days till dry	
	Total	Initial organism				Growth by 8th day					Mean	SD
		Staph. aur.	*Str. pyo.*	Both	Neither	Pr	Dm	Dp	Healed *	Not done		
Control	26	9	3	14	0	23	0	0	2	1	15·5	± 8·2
Penicillin	26	5	5	14	2†	2	11	9	4	0	7·7	± 3·2
Difference											7·8	± 2·6

SD = Standard deviation. Pr = persistence.
Dm = diminution. Dp = disappearance.
* Healed = before 2nd swab.
† = (1) micrococci, heavy growth; (2) hæmolytic streptococcus, not group A.

TABLE II—PULP INFECTIONS: ARREST OF SEPSIS

—	Bacteriological findings *: number of cases							Days to disappearance of pus		
	Total	Initial org.	Growth by 8th day							
		Staph. aur.	Pr	Dm	Dp	Healed §	Not done	Cases †	Mean	SD
Control	27	27‡	24	1	0	1	1	21¶	14·2	± 12·8
Penicillin	28	28	4	5	18	1	0	22	1·4	± 2·7
Difference									12·8	± 2·9

* Including osteitis cases. † Excluding osteitis cases.
‡ 1 case with hæmolytic streptococcus not group A, B, C or G.
¶ 2 cases not recorded. § Before second swab.

TABLE III—SIMPLE PULP INFECTIONS: RESULTS

—	Dry			Epithelialised			Full movement		
	Cases	Days		Cases	Days		Cases	Days	
		Mean	SD		Mean	SD		Mean	SD
Control	23	20·7	± 13·0	19*	29·7	± 13·5	22*	25·7	± 19·5
Penicillin	22	10·8	± 4·8	20*	21·7	± 8·7	19*	11·7	± 4·3
Difference .		9·9	± 2·9		8·0	± 3·7		14·0	± 4·3

* Remaining cases did not report for examination.

At operation, bilateral incisions were made at the angles of the nail fold and as much nail as was considered necessary was removed. Controls were dressed with a paraffin gauze wick inserted between fold and nail bed. In the treated series penicillin powder (about 100 units in 10 mg. of the Ca salt) was inserted below the fold and spread over the nail bed, followed by a penicillin paste gauze wick (150–250 units per g.). After-treatment consisted in daily dressings till the nail bed showed signs of drying. All wounds were wiped over with 1% 'Cetavlon'; a eusol and paraffin dressing was applied to the controls, and in the penicillin-treated cases, penicillin paste was applied for two or three days, followed by a dusting of penicillin powder at subsequent dressings, if necessary, to prevent reinfection.

This group exemplifies a superficial infection. Even in the less amenable cases the infection persisted on the nail bed rather than under the fold. There was little evidence of pus in either series and drying was therefore considered an adequate clinical criterion of the arrest of sepsis.

Results.—Treated cases not only dried in half the time of the controls but showed less variability in their course. Persistence of pain was greatly reduced, and the time for full epithelialisation and restoration of movement of the finger followed the same relation to the control cases as did the time of drying. As regards the choice of time for operation, in the control series there was little difference in the course of healing whether surgery was early or late, but among the penicillin cases the time of drying was shorter and less variable when surgical interference was early.

PULP INFECTION

This group (tables II and III) was confined to deep infections of the soft tissues of the pulp, all merely subcutaneous abscesses being excluded. The number treated in both series was the same but osteitis was present in 6 penicillin cases and in only 4 of the controls. The very different prognosis necessitated the exclusion of these cases from the statistical comparison. They will be dealt with later among infections of bone.

Sex and age incidence differed in the two series. Sex did not appear to affect recovery, but the inclusion of 2 cases over 45 years old in the control series may have weighted the scales in favour of penicillin. Surgery consisted in a lateral incision through the soft tissues of the terminal phalanx extending almost to the opposite side but leaving the skin there and at the tip intact. Paraffin gauze packing was inserted into control wounds and subsequent dressings were the same as for paronychia. Penicillin cases received 300–500 units as dry powder (30–50 mg.) and a gauze pack liberally supplied with the paste. Subsequent daily packings (for 5 days) consisted of paste only in mild cases, but where slough,

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signs of tendon-sheath irritation or osteitis were present dry powder was also inserted.

Results.—In this series, as in paronychias, variability in the course of healing was much greater in the controls. Pain was so constant a feature that it was thought of value to compare its persistence after operation in the two series. Since these were outpatients the emotional influence of different dressers was eliminated, as was also any knowledge that one set of patients was receiving different treatment from the other. Pain and throbbing in all but 3 control cases lasted for 1–9 days where there was a simple pulp infection and up to 21 days where there was osteitis. Of the penicillin cases, 19 suffered no pain at all, gaining immediate relief after operation, and the longest period of pain among the remaining 8 was 4 days. Pus was constant in the control series and drying followed comparatively rapidly when it disappeared. It was seen in only 5 of the penicillin cases and was scanty when it did appear.

Expectant preoperative treatment was carried out in half of each series. Though numbers were small, its value for control cases is possibly shown by arranging the cases according to the duration of sepsis. The postoperative course varied considerably more in those operated on after 1–3 days of symptoms than in those operated on at the end of a week, provided they escaped bony involvement. By contrast, the penicillin cases showed much the same time and variation in drying, whether operated on early or late.

WEB-SPACE INFECTION

The general factors affecting prognosis in this group (tables IV and V) differed little in the two series. In 1 control and 3 penicillin cases two spaces were involved. There was one thenar-space infection in each. Expectant treatment was carried out in more than half the cases, operation being performed when pus had reached the subcutaneous tissues. Incision into the web was sometimes accompanied by incision in the palm over the sinus left by a penetrating wound. In the thenar-space infections an incision was made on the dorsum of the hand and a way opened between the muscles to the space.

Most patients were treated in the ward with rest in bed and heat cradles when necessary. The controls in this instance received saline soaks followed by eusol packing. One case received oral sulphathiazole—26 g.—after operation. Penicillin treatment followed the usual lines. Cetavlon as a preliminary wash was not used in the ward dressing station.

Results.—In the milder cases the healing time did not differ greatly in the two series, though the controls passed through a stage of more severe inflammation. In the more serious infections there was a well-marked difference. Variability in prognosis was again a feature of the controls, and early return of the use of the hand with no further loss of tissue the most striking feature of the penicillin series.

TABLE IV—WEB-SPACE INFECTIONS: ARREST OF SEPSIS

—	Bacteriological findings: number of cases					Days to disappearance of—			
	Total	Initial org.	Growth by 8th day			pus		swelling	
		Staph. aur.	Pr	Dm	Dp	Mean	SD	Mean	SD
Control	9	9	9	0	0	15·7	± 16·0	13·1	± 13·6
Penicillin	9	9	0	3	6	3·6	± 3·33	7·7	± 5·2
Difference						12·1	± 5·3	5·4	± 4·9

TABLE V—WEB-SPACE INFECTION: RESULTS

—	Total cases	Complications: number of cases							Full movement		Healed (days)	
		Soft tissue extension	Tenosynovitis	Death of tendon	Osteitis	Arthritis	Further opn.	Loss of finger	Mean	SD	Mean	SD
Control	9	3	2	2	1	1	3*	2	24·7	± 17·3	34·2	± 20·3
Penicillin	9	1†	0	0	0	0	1	0	10·4	± 8·3	18·8	± 6·5
Difference									14·3	± 2·1	15·4	± 7·1

* 5 operations in all. † spread to a 3rd web space.

TABLE VI—TENDON-SHEATH INFECTION: ARREST OF SEPSIS

—	Bacteriological findings: number of cases								Case	Days to disappearance of—			
	Total	Initial organism				Growth by 8th day				fever		pus	
		Staph. aur.	*Str. pyo.*	Both	Nil	Pr	Dm	Dp		Mean	SD	Mean	SD
Control	11	6	1	2	2*	11	0	0	10§	12·0	± 8·8	40·4	± 21·4
Penicillin	11	4	3	2	2†	0	6	4 + 1‡	11	3·7	± 2·6	5·9	± 5·8
Difference										8·3	± 4·0	34·8	± 7·0

* *Staph. aureus* cultivated by 2nd day in both cases.
† " " " " in 1 case.
‡ No pathogens cultivated." " "
§ In 1 case (excluded) fever disappeared in 106 days and pus in 113 days.

TENDON-SHEATH INFECTION

This group (tables VI and VII) was studied with the greatest attention, since among the examples of more severe sepsis it approached most nearly to a clinical entity. Tenosynovitis occurring as a complication in other groups was excluded, as was also suspected tendon-sheath infection which did not give evidence at operation of increased fluid or perforation of the sheath by a septic sinus. A clinical rather than bacteriological criterion was adopted since a subcutaneous abscess or sinus was always present, and when this was explored first the swab from the tendon sheath was likely to be contaminated from the wound. In 4 cases—2 in each series—where the accompanying sites of infection were not opened at the first operation, swabs of the turbid fluid from the sheath were negative. These sheaths were clinically morbid and in the control series gave subsequent evidence of a very severe infection.

TABLE VII—TENDON-SHEATH INFECTION: RESULTS

—	Complications						Further opn.	Loss of digit	Movement of digit by 6 months			Full movement in rest of hand			Healing		
	Number of cases											Cases	Days		Cases	Days	
	Total	Soft-tissue extension	Death of tendon	Arthritis	Osteomyelitis	Pulp infection			Full	Impaired	Useless		Mean	SD		Mean	SD
Control	11	10	7	2	1	0	9*	5	0	4	2	9†	41·4	± 36·7	11	58·9	± 30·3
Penicillin	11	0	0	0	0	1	1	0	5	4	2	11	7·3	± 3·3	10‡	34·1	± 18·6
Difference													34·1	± 12·3	..	24·8	± 10·9

* 15 operations in all. † 2 control hands, full function not returned at 180. ‡ 1 treated wound not healed at 180.

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The sexes were distributed equally between the two series—9 males and 2 females in each—and ages approximated closely. Second and third digits were equally represented; there was one fifth digit in the penicillin series and no thumb in either.

The severity of the lesion was judged by the type of fluid in the sheath (clear but in excess, turbid or frankly purulent); condition of tendons; and by extension into other spaces. By these standards 4 control and 6 penicillin cases were severe. Bronchitis and thrombophlebitis complicated one control; one severe penicillin case had to be treated as an outpatient after the 4th day.

Operation consisted usually in exploration of any previous sinus, followed by a lateral incision along the digit affected, retraction of blood-vessels and nerves, and opening of the sheath along the length of the digit, bridges being left opposite the interphalangeal joints. The sheath was opened near its root by a second incision in the palm. Web spaces were incised when pus had tracked into them.

Five controls received a sulphonamide by mouth—sulphathiazole 26–39 g. in 4 after operation (followed in one bronchitic patient by sulphamezathine 60 g.), and sulphanilamide 25 g. in one streptococcal case before operation. One penicillin patient with a streptococcal infection—the most severe—received sulphanilamide 10 g. for two days before operation. His temperature was rising; redness, swelling extending well up the forearm, lymphangitis, and axillary adenitis were well-marked by the time operation was carried out. The sulphanilamide had had no obvious effect.

Controls were dressed as for web-space infections, twice a day where there was copious pus, and one received local applications of sulphathiazole cream. Plaster was used after the 7th day in one control and during the lengthy convalescence of another. It was applied to one penicillin-treated hand for a few weeks when healing was much delayed. Ascorbic acid in sufficient quantities to appear in the urine was given to 4 controls and to a penicillin patient who was one of the least severe cases and the quickest to heal (15 days).

Penicillin treatment followed the same lines as in other groups—at operation a liberal dressing of the dry Ca salt (40–100 mg. of a 10 unit per mg. preparation) was spread over all parts of the wounds, followed by a packing of paste (150 or 250 units per c.cm.) on gauze. Dressings were not repeated more than once in 24 hours and in the later cases were discontinued by the end of the first week. When slough persisted and bacteriological reports indicated the presence of *Staph. aureus* or *Strep. pyogenes* dressings were continued but less frequently. These infections were so severe that there was a tendency to overdose, but even so, the longest involved the use of only 13,000 units; other cases received 2500–7000 units.

All patients were given instruction and encouragement to move their fingers after the 5th day, though this was temporarily suspended in those controls which showed signs of exacerbation.

Results.—The course in the controls was, as usual, difficult to predict, infections which appeared mild at operation sometimes progressing to much slough formation and even loss of a digit. Pus was copious in nearly all controls and slough a prominent feature. The control case shown separately in table VI had a most persistent mixed infection with many exacerbations and extensions of inflammation and sloughing. Though he received 30 g. of sulphathiazole he had intermittent fever for 106 days, pus persisted for 113 days and his wound was not healed till 119 days. Pus was always scanty in the penicillin patients and only distinguished with practice from the residues of paste dressings; the times in the table represent the upper limit at which there was any chance of pus being present.

Though sepsis was arrested before the end of the first week in 10 of the penicillin patients, and controlled in the eleventh, which had a persistent slough, healing time varied within wide limits. In milder cases it was as short as 2–3 weeks, in one severe case longer than 24 weeks (see general discussion later). The early return of movement was again a prominent feature and appeared to go hand in hand with the reduction in swelling. Dorsal swelling after operation was well-marked in both series, but, whereas it took from 5 to 82 days to subside in the controls, the œdema insensibly merging into a firm thickening of the whole hand, the longest period for which it persisted in the penicillin cases was 16 days and the shortest 1 day.

Another aspect of the comparison, not too easy to assess, was general health. These patients with severe sepsis were ill, suffering from fever, loss of appetite, pain and often sleeplessness; when sepsis persisted their pallor and even loss of weight were obvious. Penicillin patients were fit enough to be asking to go home in the second week; their dressings were often painful but apart from this they appeared to recover rapidly from their infection and to suffer little pain.

Where frank pus had not developed in the sheath at the time of operation, penicillin patients regained the full use of the hand and affected finger in 4–6 weeks without recourse to finger-exercise classes, and were ready and anxious to return to work. Even in the 6 patients, whose tendon sheaths had contained pus at operation, penicillin treatment alone appeared to achieve as much as the continuation of remedial exercises in control cases long after their discharge from the wards. (Of the 3 penicillin patients in this group whose remedial exercises were prolonged, none showed any definite benefit.) It appeared as if the rapid resolution of sepsis had accomplished the same task as was achieved in control cases by weeks of exercises after healing.

Return to employment.—The data from the tendon-sheath infection also make it possible to measure the value of penicillin treatment as a means of accelerating the patient's return to useful employment; it is noteworthy that the average absence from work of 10 control patients was 100 ± 50 days and that of all the treated patients 54 ± 19·5 days. End-results, observed up till 6 months from the first incision, are compared in fig. 1.

Three tendon sheaths which were explored during the period of this investigation and which showed no evidence of infection at operation gave an indication of the length of time in which healing and functional recovery might be expected to take place in this situation in the absence of sepsis. In 2, healing took place in 15 and 23 days and function returned in much the same time. The third, whose wound became infected with *Staph. aureus* from a subcutaneous abscess, was completely healed in much the same time, but complete function was only regained after 57 days.

ABSCESSES

This group (table VIII) comprised well-formed and circumscribed abscess cavities in various parts, including dorsum and palm of the hand, forearm, arm, axilla, groin and back of the neck. As far as possible the same sites were included in each series. Three-quarters of each series had received expectant treatment and in some resolution was obviously taking place (cultures from one control were negative and another showed only scanty growth); the value of using a bacteriostatic drug at this stage was not likely to be great. In one penicillin patient, infected above and below the dorsal fascia of the hand, adequate access was only obtained at a second operation, and times have been measured from then.

TABLE VIII—ABSCESSES. ARREST OF SEPSIS: HEALING

—	Bacteriological findings: number of cases								Days till disappearance of pus		Dry	
	Total	Initial organisms				Growth by 8th day			Mean	SD	Mean	SD
		Staph. aur.	*Str. pyo.*	Both	Sterile	Pr	Dm	Dp				
Control	12	9	2	0	1	9	1	2	9·6	± 7·8	23·6	± 10·3
Penicillin	12	8	1	3	0	1	4	7	3·4	± 1·8	20·8	± 10·9
Difference		..		..		..			6·2	± 2·8	.	..

Three abscesses—in the glands of axilla, groin and occiput respectively—were treated by injection of penicillin solution. The abscess was incised at the uppermost part in relation to the patients' position in bed, loculi were opened and the contents evacuated. Rubber tubing, ¼ in. in diameter, was placed in the wound so that its extremity reached to the lowest part of the cavity, the wound was sewn up and the rubber tubing sutured to the skin. Firm dressings were applied, the

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TABLE II.—BACTERIOLOGICAL FINDINGS IN SEPTIC LACERATIONS AND MISCELLANEOUS GROUP

Cases of septic lacerations	Total	Initial organisms				Growth by 8th day		
		Staph. aur.	*Str. pyo.*	Both	Coliform	Pr	Dm	Dp
Control ..	5	2	0	3	..	5	0	0
Penicillin ..	6	1	2	3	..	0	3	3
Miscellaneous cases								
Control ..	12	10	0	2	0	12	0	0
Penicillin ..	18	10	2	5	1	2	8	8

distal end of the tubing being brought through them. Penicillin, 500 units per c.cm., was then injected into the cavity. Injection preceded by aspiration was repeated 12-hourly for 4 or 5 days. At the end of that time the dressings, tubing and stitches were removed. A dry dressing under elastic plaster was applied and left in situ till the mouth of the sinus had dried.

Results.—Healing time, and in some cases cessation of pus were much the same in the two series, but, as in other groups, the amount of pus formed was much less under penicillin treatment. In the abscesses injected with penicillin solution the skin edges healed by primary union. When the dressings were removed induration of surrounding tissues had subsided and cultures were free of the initial organism. There were no painful dressings, so characteristic a feature of septic cases.

SEPTIC LACERATIONS OF HAND

The septic lacerations in the penicillin series were of such severity that certain aspects are worth describing, but in this and the following group the only comparison of value is bacteriological (table IX). Clinically, each case was different and comparison is impracticable. The penicillin cases, with one exception, had the most serious infections introduced into the ward during the time of the investigation. All had open suppurating wounds which involved more than one tissue. There were 3 with compound fractures, 2 with suppurating joints and 4 with tendon-sheath infections, one with a necrotic terminal phalanx and another with suppuration and necrosis in the deeper planes of the palm. Injury had occurred 12–17 days earlier and was treated by excision, suture and plaster splinting. Signs of infection did not develop for upwards of a week and the cases were treated expectantly for from 2 to 8 days. No sulphonamides were given. By the time they came to operation the 5 inpatients had fever, considerable swelling of the hand, and ragged, purulent and sloughing wounds.

Hanging distal segments of digits were removed at operation in 2 instances but were retained in the remaining cases, including the necrotic finger. Treatment with penicillin followed the usual lines. Intensive treatment was given for 6–10 days, followed by paste only until all dead tissue had separated. No case received more than 13,000 units.

Adequate access to all sites of infection was obtained at the first operation in all patients but one, and he demonstrated well its necessity when penicillin is applied locally. An open suppurating terminal interphalangeal joint, with the tendon sheath perforated near its insertion and the middle phalanx stripped of part of its periosteum, was found at the first operation. Incisions were made on both sides of the joint, penicillin being applied in the usual way. Though pus ceased to collect in the wounds there was evidence of its presence in the tendon sheath by the 3rd day. This was then opened on the finger only, but, though these wounds were free of pathogens and pus by the 7th day, perforation of the sheath had occurred in the palm and led to the collection of pus in the thenar and first web spaces, reaching as far as the level of the carpal tunnel. When these cavities were finally opened all wounds became free of pus and pathogens within 4 days and remained so for weeks without further treatment.

Results.—The table showing the arrest of bacterial infection has some interest, although only one control case was comparable in severity or extent of damaged tissue to those treated with penicillin.

Once sepsis has been controlled the difficulty of regaining full function of the hand, even after the removal of infected digits, is the major therapeutic problem. The period of many months spent in treating such loss of movement is well known to all concerned with the surgery of the hand. It is regrettable that the control series is not of value as a comparison, but patients who had had more severe injuries, comparable to those in the penicillin series, were seen during the period of this investigation, and on them these facts were readily demonstrated.

The results of the penicillin treatment may be set out in a general way, as follows:

(1) In 4 cases full function of all parts of the hand, other than the digit primarily affected, had returned in 2–3 weeks. The most severe case—compound fracture of phalanx, tendon-sheath infection, and sloughing and suppuration in all planes of the middle palmar space as far as the carpal tunnel—regained full movement in 2 months without special physical therapy. In the only similar case seen in the preceding year the patient had not closed his fist completely 12 months after sepsis was first apparent. The 6th penicillin patient was

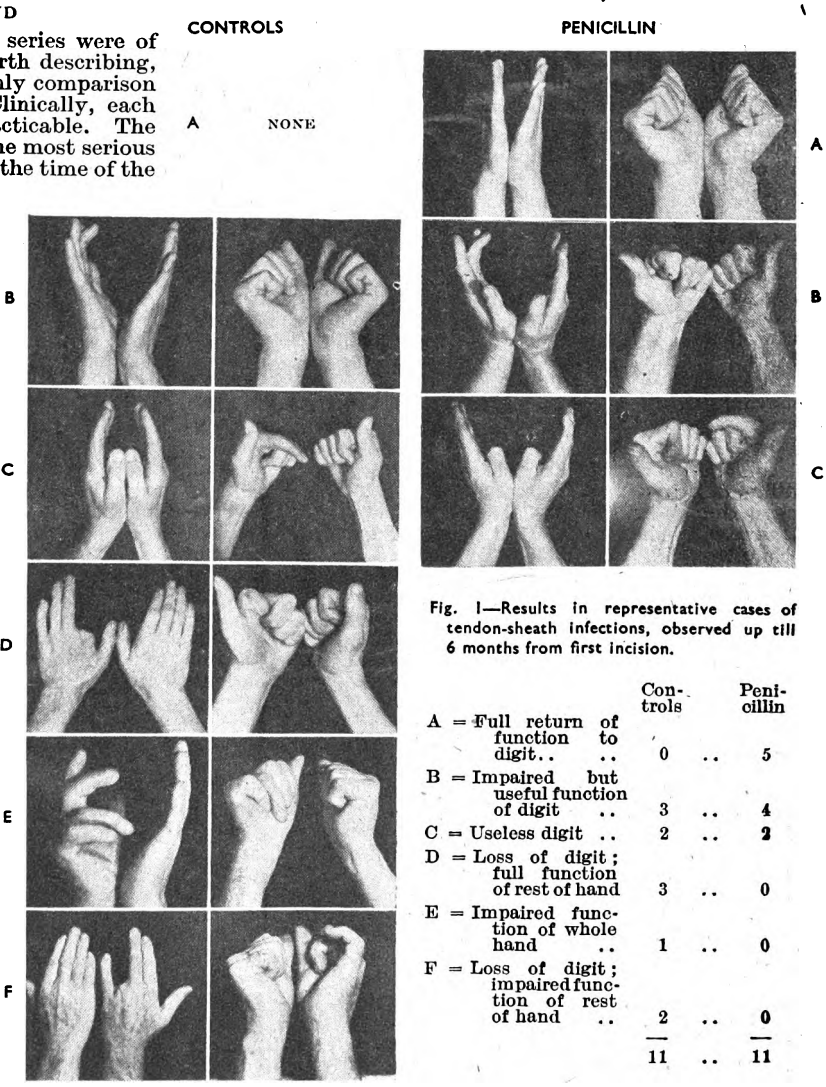

Fig. I—Results in representative cases of tendon-sheath infections, observed up till 6 months from first incision.

	Controls	Penicillin
A = Full return of function to digit.. ..	0	5
B = Impaired but useful function of digit ..	3	4
C = Useless digit ..	2	2
D = Loss of digit; full function of rest of hand	3	0
E = Impaired function of whole hand ..	1	0
F = Loss of digit; impaired function of rest of hand ..	2	0
	11	11

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suffering from disseminated sclerosis, but, in spite of this and of having two suppurating wounds communicating with separate tendon sheaths, he regained full flexion in 3 months. Of 2 similar untreated cases seen in the hospital, a young man of 20 had not regained full function of remaining parts till 5 months from operation and a man of 43 could not grip after 8 months. (The one control case of this group which can be considered comparable had not regained full movement, in spite of removal of the digit, after 4 months.)

(2) Apart from projecting fragments of bone, none showed sequestrum formation.

TABLE X—WHOLE SERIES: INITIAL INFECTING ORGANISM

—	Total	*Staph. aur.* alone	*Str. pyo.* alone	*Staph. aur.* and *Str. pyo.*	Hæmolytic strep.	Micrococci	Coliform
Control	102	74*	6	21	0	1	0
Penicillin	110	66†	13	27	1	2	1

* 3 first isolated 2nd day from operation.
† 1 „ „ „ „ „ „

(3) Apart from the case with a necrotic phalanx, there was no loss of a digit after penicillin therapy was begun or of any other tissue in fingers or hand.

Further results worth noting were: tendons declared at operation to be dead regained their function; ankylosis occurred in cases with arthritis without any sequestrum formation, and movement in adjoining joint returned so that useful digits were preserved. More than one surgeon had warned these patients that they would lose their fingers.

MISCELLANEOUS GROUP

These were mainly septic wounds (fig. 2) or surfaces of some weeks' or months' duration where treatment with penicillin was not related to the time of operation. A bacteriological comparison is the only one of value (table IX).

This group does no more than indicate the value of penicillin in such conditions as chronic septic dermatitis, in preparing infected surfaces for skin-grafts or stumps for amputation, and in preventing the extension of a septic process.

General Considerations

BACTERIOLOGICAL OBSERVATIONS

Bacteriological comparison was applicable to all cases of both series. Table X summarises the original infecting organisms. Changes in or persistence of original growth from first swabbing till healing had taken place are shown in table XI.

The response to the drug in almost all penicillin cases led to an attempt being made to find the earliest time at which bacteriological evidence of the arrest of sepsis could be obtained. It was not practicable to swab all cases daily, so that an exact date for the arrest of infection cannot be stated. By the 8th day practically all cases which had not healed had been swabbed a second time and this day is therefore selected for comparison, although growth from the majority of penicillin wounds was scanty or absent before then (table XI).

The body appears to be quite capable of dealing with a scanty growth of organisms in open wounds once granulations have formed. This is borne out by the observations on the controls in which pus formation had ceased, the wound was superficial and healing was progressing though pyogenic cocci could still be cultivated from the surface.

Reinfection.—Organisms reappeared in cultures after disappearing from some of the penicillin-treated wounds. (The instances of disappearence from control wounds were so few and so late that a comparison is valueless.) It is impossible to say whether this reappearance was an indication that infection had not been completely eliminated or that a fresh infection had been added. When it occurred during penicillin administration the former interpretation was given. In the 5 instances where this happened inadequate access or the presence of dead tissue had prevented the complete elimination of infection.

Newly appearing infection.—This was found in some wounds of both series but it is noteworthy that, whereas *Strep. pyogenes* was the most usual secondary invader in control wounds, among penicillin-treated wounds it was coliforms. The clinical significance of the former is difficult to assess, though they were commonly found in the more serious infections of the outpatient groups. Though penicillin-treated wounds appeared to be more susceptible to infection by colforms, no effect on the clinical course was noted in the outpatient groups. In the more widely open wounds of the 5 ward patients epithelium seemed to grow more slowly and even to disintegrate when newly formed. Daily applications of sulphonamide powder removed these organisms in 5 days, though they returned after discontinuance in the two cases which were not already healed (table XII).

TABLE XI—WHOLE SERIES: GROWTH DURING COURSE, AND BY THE 8TH DAY

—	Total cases	Growth during course					Growth by 8th day		
		Pr	Dm	Dp	Not done	Healed*	Pr	Dm	Dp
Control ..	102	73	14	10	2	3	93	2	2
Penicillin ..	110	4	23	78	1	4	9	40	56

* Healed before second swab.

TABLE XII—NEW-APPEARING INFECTION

—	Total cases	*Staph. aur.*	*Str. pyo.*	Coliform
Control	21	3	16	2
Penicillin ..	21	4	1	16

Persistence of growth.—Table XI shows there were 9 treated cases whose wounds showed no response to penicillin by the 8th day. These were:

(*a*) Two paronychias which were healed in the same time as other penicillin-treated cases, though the amount of penicillin used was not sufficient to remove all the bacteria.

(*b*) Five cases in which dead tissue was present, usually where bone was involved. When the slough disappeared or the projecting bony fragment separated the organisms also vanished. Signs of inflammation, however, subsided as quickly in these cases as in those without slough.

(*c*) Two where surgical access was inadequate. Further incisions were followed by the disappearance of organisms within a few days.

PROGRESS OF WOUNDS

The earliest and most striking difference noted between the two series was in the pus formation. Pus did not appear or was scanty and had completely ceased to form within a week from operation in all but 6 cases among the penicillin series. In the controls, with the exception of 1 case, it continued for anything from 3 to 113 days.

Where incisions were made directly into well-formed abscess cavities lined with granulation tissue in the penicillin series slough was very much less than and separated as rapidly as in control wounds. Once separated there was no further formation.

Where incisions were deepened through inflamed tissue which had not reached the suppurating stage other differences were noted. They were seen in pulp-infection wounds but still better in the larger incisions made for tendon-sheath infections. Though free bleeding at the time of dressing obscured the surfaces of the control wounds for the first few days, there was no apparent difference between the two series in the early stages; sharp-edged, steep sided wounds passed into more open gutters with varying degrees of slough formation on the surfaces.

In the controls thick pus had appeared by the 2nd to the 4th day and was greeted with relief by the dressers. It was followed by softening and separation of sloughs but fresh sloughs continued to appear, both on the surface and in the depths of the wound. The sides of the wound continued to swell, and gaped to a considerable degree, till the digit looked like a fat split sausage. Granulations grew exuberantly over the whole surface, filling the wound and rising above the level of the surrounding skin.

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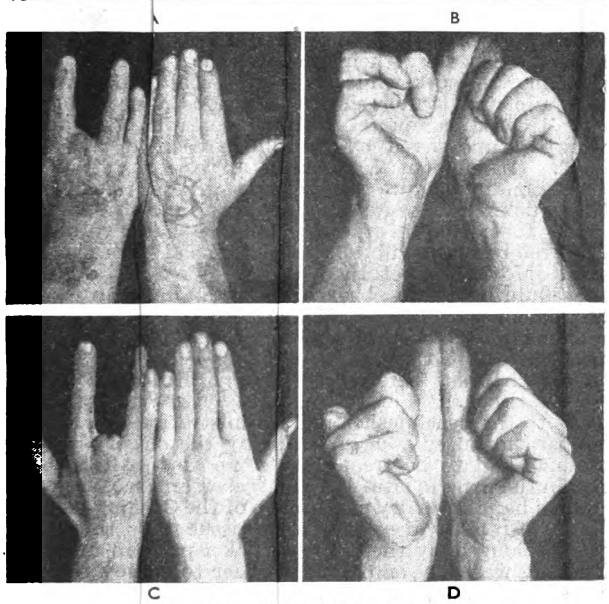

Fig. 2—Right palmar sepsis

A and B, controls; following laceration of palm and tendon-sheath infection; hand cannot grip 52 weeks after first incisions in spite of prolonged massage and remedial exercises.
C and D, penicillin-treated; following compound fracture of proximal phalanx and tendon-sheath infection; hand closed fully 8 weeks from incisions and removal of digit without remedial exercises.

In penicillin-treated cases, if pus formed at all it was so scanty as seldom to be distinguishable from the penicillin paste residue. The small amount of bleeding during early dressings added to the lack of pus formation made the "dirty" stage of the wound appear much longer than in the control series, whereas in reality granulation tissue began to form at the same time in both. Slough, if it did form, did not disappear in bulk but remained on the surface of the wound in the more severe cases till well into the healing period. Gaping of wound walls sometimes occurred, but was of much less extent than in the controls, and granulations remained smooth and moist and were not abundant. Wounds which healed rapidly did not gape more than ¼ in. and the granulation tissue was sufficient to bridge this gap, but when healing

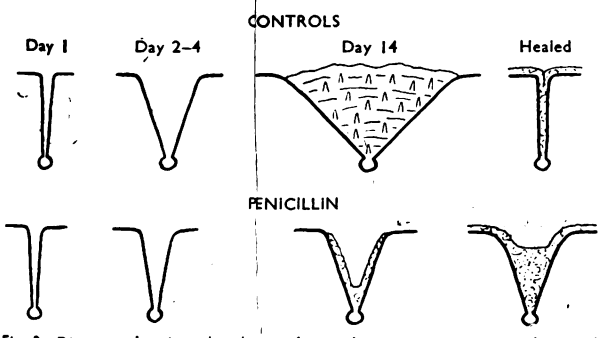

Fig. 3—Diagram showing abundance of granulation tissue in control wound, and lack of it in penicillin-treated wound, which therefore depends on epithelial growth for closure.

took more than 3 weeks the gap grew wider. In these cases it appeared that the newly formed fibrous tissue was not sufficient to draw the edges together as was obviously the method of healing in the controls, where epithelium merely had to bridge a narrow gap to complete the process. In the penicillin wounds epithelium grew down into the wound and later across the gap between the two sides, eventually forming a smooth valley along the side of the digit. Scars so formed were soft, seldom puckered and not tender. Final closure of the wound, therefore, depended mainly on contraction of granulation tissue in the controls and on epithelial growth in the penicillin cases (fig. 3).

Pulp-infection wounds demonstrated this difference particularly well. No packing was used in the penicillin cases after the 5th day so that wound walls fell together readily but the skin layer always retracted further than the subcutaneous tissue. Even though subcutaneous tissues remained in apposition, epidermis had to grow over an oval area about 3 mm. wide before healing was accomplished.

SWELLING

An increase in the swelling of surrounding parts was very obvious on the day after operation. This occurred in both series and in all groups except possibly paronychias. Where infection had reached the palm, dorsal swelling was prominent. Its subsidence was taken as a useful index of the diminution of the infection. The tendon-sheath infections again form the best series for comparing this, for it was a well-marked and constant accompaniment of the condition. The controls showed a wide variation in the degree and times of increase and of subsidence of swelling. It disappeared in the 3 mildest by the end of the 1st week, in others it continued for 14–100 days. When the œdema disappeared a firm generalised thickening remained which persisted in some cases for weeks or months. Penicillin cases all showed an increase of swelling on the 1st day after operation and in 2 cases on the 2nd. All were subsiding between the 2nd and 4th day, subsidence being complete in 3–16 days.

SPECIAL TISSUES

Tendons.—The majority looked pearly and taut when sheaths were opened. One of each series appeared to be sloughing at the time of operation, granulations were growing on a few, and in 3 of the penicillin patients the tendons were so lax and lustreless as to be considered non-viable by the surgeon. In the 11 primary and 3 secondary infections of the control cases death of the tendons occurred in 9. Destruction of the tendons in some cases extended into the palm beyond the sheath and even into extensor tendons as well. Survival of all tendons, even those suspected of being non-viable, occurred in the penicillin-treated patients, as evidenced by return of movement at all joints. In the cases treated at later stages, however, when there were granu-

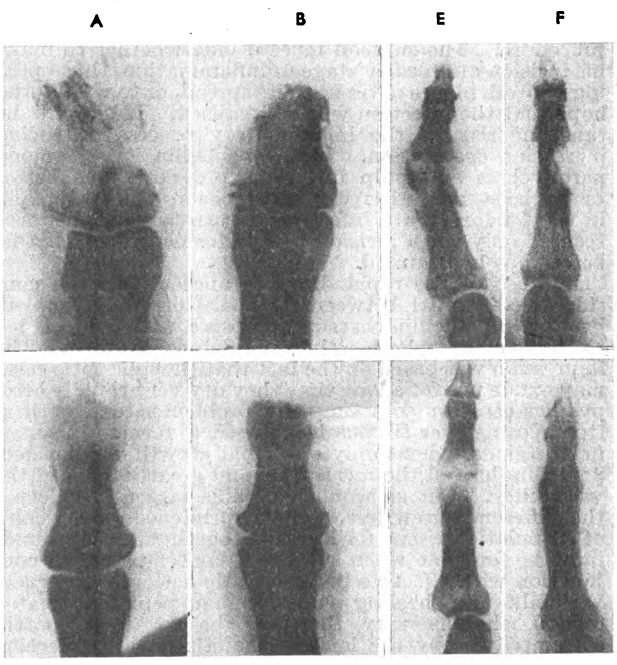

Fig. 4—Osteitis of terminal phalanx. A and B, controls; C and D, penicillin-treated.
A, 7 weeks from first incision. C, 1½ weeks from incision.
B, 22 weeks from first incision. D, 6 weeks from incision.

Fig. 5—Osteo-arthritis of interphalangeal joint. E and F, controls; G and H, penicillin-treated.
E, 6 weeks from injury; 2 weeks from first incisions, before sequestrectomy.
F, 12 weeks from injury; 8 weeks from first incisions.
G, 3 weeks from injury; 1½ weeks from incision.
H, 11½ weeks from injury; 10 weeks from incision.

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lations and thick pus in the sheath, movement was impaired, and in the 2 most severe cases almost lost.

Bones.—There was evidence of bony involvement in 7 controls and 11 of the penicillin cases. Sequestra had to be removed from 4 of the controls. Apart from projecting bony fragments no sequestra were removed from the penicillin series. Radiograms demonstrated the same well-marked rarefaction of bone after penicillin therapy as was noted in an earlier investigation (Florey and Florey 1943), so much so that reports received from radiological departments were at variance with the clinical condition. Recalcification of bone occurred readily in spite of the great amount of absorption. In the most severe pulp infection the whole head of the terminal phalanx had re-formed 6 weeks after operation (fig. 4). In 2 of the mildest control infections healing of the bone took about the same time, but in the 2 more severe controls the head of the terminal phalanx had not re-formed in 16 and 26 weeks respectively. Swelling of the digit and aching after much movement occurred for months after healing in 4 of the controls, necessitating amputation of the terminal phalanx in one instance. It was not met with in any of the penicillin cases.

Joints were involved in only 5 cases (fig. 5). Three penicillin cases and one control became ankylosed. The other control had to have his digit removed because sepsis had spread to tendons and caused their death.

Discussion

There can be little doubt from these series that the local application of penicillin can arrest sepsis rapidly in the hand. That it can be controlled between the first application and at latest the third day and completely overcome by the end of the first week may be claimed, provided always that adequate access has been secured and all dead tissue removed. Although, after incision, swelling of the part increases, spread of infection is not necessarily the cause, since surgical trauma on already inflamed tissue or circulatory disturbances, consequent on the use of a tourniquet at operation and tight bandaging afterwards, may be responsible.

It must be emphasised that for all but 3 of the present series there was no modification of the usual surgical procedure. The surgeon must decide whether to make his incision at an early stage of inflammation, thus opening up fresh planes of tissue to its spread, or to wait in the hope that the infection will be localised. If he waits he runs the risk of the inflammatory process producing increasing destruction. In the penicillin series, among paronychias and pulp infections prognosis was better or at least not altered when incision was early, and in the tendon-sheath infections return to normality was secured only when incision was performed early, that is, before pus had formed.

Because of the rapid disappearance of pus the considerable interval between its cessation and complete healing in penicillin cases as compared with controls led to the question whether the drug delayed healing. The impression was based on the fact that though septic cases may exude pus for a long time they dry very rapidly after pus has ceased; sometimes the problem is to keep them from closing over till pus has ceased to form. In superficial lesions, where only epithelial growth was needed, penicillin halved the mean time and greatly reduced the variability. But as wounds became larger and deeper the difference grew less. The dependence on a wealth of granulation tissue for knitting together septic wounds must be foregone when surgery is contemplated in conjunction with effective bacteriostatic action. The great variability in healing time among penicillin-treated tendon sheaths may therefore be at least partly accounted for by the lack of the stimulus of infection to fibroblastic growth.

In assessing the viability of tissue at operation somewhat revised standards are required when a bacteriostatic drug is used. Further destruction is prevented, and, as exemplified by some tendons in this series, tissue considered dead by ordinary standards is capable of returning to functional activity when the effect of sepsis is rapidly eliminated.

The end-results of infections of the hand cannot be assessed in terms of healing time alone. Among the controls it was often months after the original wounds had healed before a man had an effective hand with which to work, whereas some penicillin cases felt so little disturbed by their wounds that they insisted on returning to work while these were still open. Among the pulp and tendon-sheath infections alone (35 penicillin-treated compared with 35 controls), the actual working time saved by penicillin treatment was 1000 days. (Insufficient data made an assessment of the corresponding figure for all the groups impossible.) The quick return of function would seem to be a result of small formation of fibrous tissue because resolution occurred before the fibroblast reaction had become extensive. Movement returned as soon as excess inflammatory fluid had been absorbed from the inflamed tissues. Movement was slowest to return in the most severely affected digit, but in the severe cases more movement was possible before than after complete healing had taken place—that is, before granulations had turned into fibrous tissue.

As to the best methods of administration, the type of preparation used was governed by the surgery. Open wounds had to be treated by some means that would retain the drug in situ. For this reason and because of its ease in handling a dry preparation of the Ca salt was used, but as it rapidly dissolved in the tissue fluids the action was prolonged by the use of a weaker paste in addition. Packing was only employed in order to convey the preparation to all parts of the wound. This method had two disadvantages—the possibility of damaging wound surfaces by the initially high concentration of the Ca salt, and the keeping of the wounds open. About half the patients complained of burning, but not if paste or solution was used alone. The preparation used contained not more than 1% of penicillin and the impurities present may have accounted for any ill effect on the cut tissues.

It seems well worth while exploring further the possibility of closing or partially closing abscesses after evacuating the pus, penicillin solution being instilled for the next 4–5 days. The 3 cases so treated did well, no disadvantage being apparent from this method, but it was not tried in any other cases.

A major advantage gained by penicillin treatment for the patients and staff was the great reduction in the number of dressings required. Once pathogenic bacteria had been eliminated further dressings were only needed as a protection.

The great economy effected by local application as compared with general administration was well demonstrated. Not more than 500,000 units was used to treat 100 cases locally. This is about a quarter to half the amount needed to treat a single severe and well-established staphylococcal infection systemically.

Summary

A comparative study of 212 acute infections, mainly of the hand, has been made. About half were treated by current methods and the other half by local penicillin application, superimposed on the usual surgical procedures.

The great majority of control cases remained septic for well over a week and nearly three-quarters were infected till their wounds healed. In the penicillin-treated series, given adequate access and removal of dead tissue, sepsis by clinical and bacteriological criteria was eliminated within a week.

In the penicillin-treated cases pus was scanty and often absent from operation onwards. No further destruction of tissue apart from the superficial layers of the wound was seen, and this only rarely. Relief of pain and throbbing and improvement in general condition have been striking, and penicillin has effected a great saving in the number of dressings.

Mean healing time has been considerably reduced by penicillin treatment, but a few cases have shown undue prolongation of healing. Other factors may have affected this result.

In cases of inflammation of bone penicillin treatment led to rapid rarefaction concurrently with improvement in clinical condition. Reformation of bony tissue took place readily.

The rapid return of mobility to infected parts was one of the most striking features of the penicillin series, but

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complete normality was not regained after tendon sheaths had contained frank pus.

Harmful effects of the dry impure calcium salt on wound surfaces not protected by granulation tissue cannot be excluded. Some patients complained of burning when the drysalt was used.

Among chronic cases penicillin proved of value in preparing infected surfaces for skin-grafting and infected stumps for amputation, and for procuring complete healing in chronic dermatitis.

The total amount of penicillin used to treat over 100 cases was no more than 50,000 units.

Complete figures for 35 of the penicillin-treated cases showed a saving of about 1000 man-days of working time as compared with the controls.

These results have been obtained by careful attention to technique and consistent 24-hourly dressings for a minimum period of 5 days.

We are indebted to Mr. William Gissane, clinical director of the Birmingham Accident Hospital, for providing facilities for carrying out the clinical work; to Mr. T. W. Howat and Mrs. O. Müller, in whose departments most of the work was done; and to the other surgeons and staff of the hospital, and members of the Sir William Dunn School of Pathology, Oxford.

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REHABILITATION OF THE CHEST CASE

F. ROWLAND EDWARDS, M D, CH M LPOOL, F R C S
THORACIC SURGEON, EMS; ASSISTANT TO THE PROFESSOR OF SURGERY, UNIVERSITY OF LIVERPOOL

(*From the Liverpool and North Western Area Chest Surgical Unit and Department of Surgery, University of Liverpool*)

THE science of rehabilitation of patients suffering from injuries of bones, joints and muscles has developed along well-defined lines. It aims at the return to optimum function of the injured member and the restoration of the general health in the shortest possible time. Since such patients rarely have any serious lesion of the vital cardiac and respiratory systems, their return to full health depends essentially on the rapidity with which normal muscular tone, maximum joint movement and firm bony repair can be established.

Patients who have sustained a chest injury or have suffered from an inflammatory condition of the lung or pleura, or who are recovering from a thoracic operation, require a form of rehabilitation which though basically the same in principle as for other conditions often differs in detail. The respiratory system is primarily damaged; the cardiovascular system is secondarily affected, either by alteration in the intrathoracic mechanics, or by toxæmia, as well as by the long confinement to bed which has been necessary in a high percentage of such cases.

These patients, if discharged from the hospital wards to the usual type of convalescent home, take long to recover. They are rarely given graduated exercises, although they may eventually be sent to join a physical training course where they are expected to undertake severe exercise for which they have not yet developed the necessary respiratory or cardiac tone. The PT instructor as a rule has no specialised knowledge of this type of case, and the patient may receive much harsh criticism for his inability to perform exercises of which he is incapable. For the most rapid and complete return to normal of chest cases, rehabilitation must be undertaken by a team of workers specially trained in respiratory exercises, with knowledge of the physiology and anatomy, and able to detect the first signs of respiratory and cardiac embarrassment.

The following is an account of the methods adopted and the investigations made in a rehabilitation centre attached to a chest surgical unit, which undertakes the final recovery of all traumatic and operation cases. The centre is also available to outside civilian and Service hospitals, who can send in their chest surgical patients who may have not been primarily transferred to the unit for treatment, or patients recovering from inflammatory conditions of the lung—e.g., pneumonia. These facilities have been well utilised.

CAUSES OF DISABILITY

The symptom of which almost every patient complains when he enters the rehabilitation centre is dyspnœa after varying degrees of exertion.

In a normal subject the increased oxygen utilisation of muscular effort results in the formation of more carbon dioxide. The consequent rise in the hydrogen-ion concentration of the blood stimulates the respiratory centre, the breathing becomes deeper and more rapid, and as a secondary result the cardiac output is increased. This hyperpnœa does not become noticeable until the pulmonary ventilation is about twice that at rest. When the subject becomes unpleasantly conscious of his respiratory movements, and of a "shortness of breath," then the condition of dyspnœa has supervened. The nearer the pulmonary ventilation approaches to the vital capacity, the more intense is this dyspnœa. In patients with a damaged respiratory system, the vital capacity is diminished, and dyspnœa is experienced correspondingly earlier. The reduction in the vital capacity is due mainly to mechanical factors, affecting the thoracic cage, pleura and lung, and to the reflex results of pain.

(*a*) *Weakness and inefficiency of the respiratory musculature.*—Long rest in bed, causing varying degrees of atrophy, supplements the disability resulting from damage to the muscles by wounds or incisions. After trauma or operation, full muscular action is temporarily or permanently hindered by intramuscular fibrosis and intermuscular adhesions; moreover, the nerve supply of segments or of whole muscles may be interrupted. Adhesions may limit the movement of the diaphragm or so distort it that efficient action is impossible.

(*b*) *Damage to the bony structures of the thorax.*—The loss of portions of ribs causes a diminution in size of the section of the thorax to which they are related, and on inspiration that part of the chest does not expand to the normal amount. Irregular new formation of bone in these areas has the same effect on the thoracic cage, particularly if there are bony connexions between adjacent ribs. If the periosteum has been lost, permanent paradoxical respiration may develop over the wound area. Malunion of fractured ribs, particularly in the region of the neck and angles, may result in a considerable dropping of the anterior segments, with consequent reduction of normal pulmonary expansion.

(*c*) *Thickening and adherence of the pleura.*—When there has been a total involvement of the pleural cavity by an empyema, the vital capacity is much reduced, for the thickened parietal pleura fixes the internal aspect of the ribs and the normal widening of the lateral and anterior sections of the intercostal spaces on inspiration cannot take place. In consequence the chest wall moves only as a solid block and as such is ineffective. At the same time the thickening of the visceral pleura reduces the expansibility of the lung tissue. Furthermore, during the reparative processes the organising fibrous tissue contracts, drawing the ribs still further down into the position of expiration, and producing a considerable flattening of that side of the chest. There is an alteration in the shape of the ribs, both in their longitudinal curve which becomes flattened, and their cross-section which becomes triangular. A localised empyema will result in proportionately less interference with expansion.

In a non-infective pleural process such as a hæmothorax, the pleural space becomes obliterated and replaced by many fine adhesions. It seems that production of the maximum pulmonary ventilation in a lung depends upon the visceral layer being able to slide freely upon the parietal layer during inspiration, since the thoracic cage does not expand equally in all directions (Best and Taylor 1939). When the two pleural layers are adherent, though not necessarily thickened, the expansion of the lung is irregular, as it is produced by a direct pull through the adhesions, and not by a diffuse suction equally distributed over the surface by the rise in the negative intrapleural pressure. Thickening of the diaphragmatic pleura and diaphragmatic adhesions produce an even greater effect upon the movement of the

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diaphragm, and its effective inspiratory action may thus be reduced to virtually nothing.

(*d*) *Pulmonary fibrosis.*—After any destructive intrapulmonary inflammatory lesion, repair results in the laying down of fibrous tissue. Being less extensible than the elastic tissue of the lung it will thus restrict considerably the pulmonary expansion whatever muscular effort is made to produce this.

(*e*) *Loss of lung tissue.*—Where lung tissue has been lost by inflammation, trauma or operation such as lobectomy or pneumonectomy, the vacant intrathoracic space is filled by fibrin, aided by some collapse downwards of the chest wall, elevation of the diaphragm, drawing over of the mediastinum and expansion of the remaining lung tissue. Though the alveolar dilatation produced in the remaining lung tissue is persistent, it is not accompanied by an increase in the pulmonary ventilation. (This factor is difficult to determine since vital capacity readings are influenced by pleural adhesion and the elevation and partial fixation of the diaphragm.) In children who have lost lung substance during the growth period there is, however, evidence of true hyperplasia of lung tissue, which may finally produce a vital capacity and pulmonary function more approaching normal (Lester, Cournand and Riley 1942, Edwards 1939).

(*f*) *Emphysema.*—This increases the lung volume so that the chest wall takes up a position more nearly approaching the full inspiratory phase and eventually becomes almost fixed in this position by osteo-arthritic changes in the vertebræ and costovertebral joints. Similarly, calcification in the costal cartilages progressively diminishes the vital capacity as these structures lose resilience. In all patients with emphysema the expiratory phase of respiration is difficult, and forced expiration is very slow. Emphysema is often found in Service patients, where the maintenance of the position of attention with the chest "thrown out" in a stage of semi-inspiration induces emphysema. Such a training, however conducive to smartness, is detrimental to the respiratory efficiency desirable in the modern Service man.

(*g*) *Pain.*—After fracture of ribs, operation or insertion of drainage-tubes, pain and maintenance in spasm of some muscles in relation to the damaged area causes the patient to limit the movements of the affected side of the chest. He tends to take up a posture in bed which gives him maximum comfort, and almost inevitably this is a scoliotic position with the concavity to the affected side. The respiratory muscles and erector spinæ on that side are shortened. He unconsciously breathes mainly with the opposite side of the chest, a habit which is aided in the case of fractured ribs by the strapping which is usually applied to the affected side. This postural deformity secondary to pain may need exercises over a long period to overcome it, and rehabilitation should begin immediately after receipt of the injury or operation. The duty of physiotherapists, therefore, is to control this tendency to deformity at the onset, as far as is compatible with the patient's comfort. Thoracic pain, too, determines limitation of movement of the scapula and shoulder-joints, and active movements must be encouraged from the earliest moment. The presence of pleural pain often causes the patient to limit his respiratory excursions, developing a type of breathing which is shallow and on any exertion must become rapid. Bad habit in breathing can be rapidly learnt, and re-education may take a long time and prove difficult even when the cause has disappeared.

These various factors described which lead to diminution in vital capacity may be present singly, but as a rule several of them are combined in the same patient. Dyspnœa, however, is not due to these changes alone, and there are many other factors present in the convalescent which may cause stimulation of the respiratory centre.

A patient, recovering from any illness which has required a long stay in bed and which has been accompanied by some degree of toxæmia, will have lost weight, and his tone—muscular, vasomotor or cardiac—will be low. He will have dyspnœa on exertion, secondary to his hypotension, tachycardia and poor muscular efficiency. A sense of fatigue is easily induced. Anæmia is quite often present as a secondary cause of the dyspnœa.

All these factors must be separately assessed and the appropriate remedial measures taken.

INVESTIGATION OF THE PATIENT

On admission of the patient to the rehabilitation centre a full history is taken, unless his story is already known, as would be the case if he were transferred from the wards of the chest centre. A clinical examination is made. The chest is screened and radiographed, and he is weighed. The chest expansion and abdominal expansion are measured. A spirographic curve is then taken which gives the following information:—

1. Tidal air.
2. Pulmonary ventilation in litres per minute at rest.
3. Vital capacity.
4. Complemental air.
5. Supplemental air.
6. Maximum breathing capacity.
7. Evidence of inherent pathological process as shown by the shape of the curve (Cournand, Richards and Darling 1939).

If there is clinical evidence of anæmia a blood-count is taken.

The patient is then classed for exercises and joins his particular group. As he improves he is put into progressively higher grades. A continuous check is kept on his improvement by vital capacity readings, chest and abdominal expansion measurements, and screening. When he is approaching his maximum degree of fitness a standard exercise test is made, and the cardiopulmonary efficiency estimated by means of the mercury U-tube.

Fluoroscopy is extremely important in assessing the cause of the respiratory deficiency, and is undertaken in the presence of the physiotherapists. The movements and expansion of each side of the chest are studied individually, through the phases of deep inspiration to deep expiration. The areas of deficient ventilation are pointed out to the physiotherapists for especial attention.

The diaphragmatic action on both sides is observed, the presence of adhesions or distortion noted. The rise of the diaphragm between full inspiration and expiration is measured by a metal bar toothed at each ½ in. This value is compared with the diaphragmatic rise produced by the patient doing his special diaphragmatic exercises before the screen. The difference between these two figures can be surprising, and if it is considerable indicates that the patient is not yet correlating his costal and diaphragmatic breathing to the full. He is rotated laterally to right and left, and the diaphragmatic, chest wall, lung and heart movements studied. In war injuries, foreign bodies which may have escaped observation in the standard anteroposterior and lateral films are occasionally brought to light by this procedure and may have an important bearing on the patient's dyspnœa and symptoms. Scapular and shoulder-joint movements are noted by raising the arms above the head. Scoliosis, if present, is examined from the point of view of voluntary correction. Where pain is present at some particular phase of respiration, the cause for this is occasionally seen to be due to a sudden diaphragmatic or mediastinal tug.

The rehabilitation staff find this visual demonstration of the deficiencies which they are endeavouring to overcome of great value, and each patient is screened every 14 days, the improvement being demonstrated.

Radiography.—Films are examined particularly for fractured ribs, distorted regenerated ribs, thickened pleura, persistent effusion, pulmonary fibrosis, diaphragmatic distortion or adhesions, mediastinal distortion, scoliosis, and presence of foreign bodies. All these points are of importance in assessing what improvement may be possible, and what further treatment besides physiotherapy may be necessary. It should be emphatically stated, however, that radiography must be supplemented by screening if a true indication of the chest condition is to be obtained.

Chest and abdominal expansion.—The chest expansion is measured at the nipple line, and is a valuable indication of the pulmonary ventilation due to upper and mid-costal action. The lower chest action is well demonstrated by the expansion measured midway between the ensiform and the umbilicus. Continued improvement in these two figures is one of the best indications of the value of the rehabilitation course. The figures naturally vary

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with the hight and weight of the individuals, but typical figuns are :—

	Chest expansion	Abdominal expansion
At start	2 in. ..	1½ in.
At end	5 in. ..	4 in.

Weight.—The patients are weighed weekly, and this is a good indication of the general improvement in bodily health. If the increase in weight stops, except in the final stages, the cause should be investigated. Apart from obvious reactivation of a pathological process, or an intermittent infection, the cause is usually mental, due to personal or family troubles, and every effort should be made to have these cleared up for him.

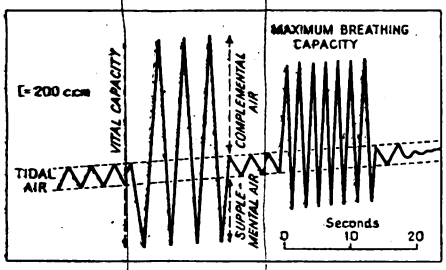

Fig. 1—Spirographic tracing with pulmonary volumina indicated (diagrammatic).

Spirographic tracings.—The apparatus used for this is a modification of the Benedict-Roth apparatus for determining the basal metabolic rate. It is necessary for accurate recordings that the patient should be used to the feeling of respiration with the apparatus in circuit, and he should try it out either an hour or so beforehand or on the previous day. The type of curve obtained is shown in fig. 1. The investigation, analysis and value of these curves in chest cases will form the subject of a separate communication, but a few facts may be noted here.

A tidal air of about 400 c.cm. with a resting pulmonary ventilation of 7–10 l. per min. is the normal figure found. If the figures are much higher than these then there is incipient dyspnœa at rest. The tidal-air phase should be in such a position that the complemental air is about twice or 1½ times the supplemental air. Most physiological textbooks are wrong in giving the figures for the complemental air and supplemental air as equal. If the tidal-air phase tends to rise into the inspiratory phase, this indicates some degree of emphysema, and will suggest more or less permanent damage to the respiratory apparatus. More severe degrees of emphysema are indicated by a dragging out of the expiration curve. The vital capacity can be measured from the curve as shown. The maximum breathing capacity value is obtained by asking the patient to breathe as deeply and rapidly as possible. From this can be calculated the maximum pulmonary ventilation that can be obtained under conditions of stress. In healthy individuals this has been found to be 8–10 times the resting pulmonary ventilation. This is the figure that should be aimed at. The pulmonary volumina are measured on these curves from the time base line and the vertical volume line, 1 cm. of which corresponds to 200 c.cm. These figures are taken on admission and near the end of the course when it is felt that the maximum benefit has been obtained. Final disability can be judged.

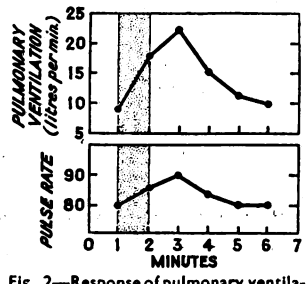

Fig. 2—Response of pulmonary ventilation and pulse-rate to the standard exercise test in a normal person. Shaded area denotes period of exercise.

Vital capacity.—This is the standard and simplest indication of progress. It is repeated every 14 days on a simple spirometer, and as long as a substantial improvement is being maintained then the course is producing benefit. The normal vital capacity of the individual can be estimated from the height and weight using the normograms (Peters and Van Slyke 1931) for calculating the surface area in square metres and multiplying by 2600 in the case of males and 2100 in the case of females. This calculated figure works out fairly well to within 250 c.cm. each way in normal individuals and can be used as an indication for the final figure to be aimed at, though will not necessarily be reached after full rehabilitation, owing to permanent changes.

Standard exercise test.—This test is performed by connecting the patient to a continuous recording spirometer. During the first minute the patient breathes at rest, during the second minute he steps up and down a block 20 cm. high, 30 times, in time with a metronome, and then the apparatus remains in circuit for the following 4 min. The pulmonary ventilation and the pulse-rate are recorded at the end of each minute and graphed (fig. 2). The pulmonary ventilation and the heart-rate should be back to approximately normal 3 min. after the exercise. If the pulmonary ventilation and heart-rate are still considerably raised after this time, fitness is not complete. The mercury U-tube test and the 40 mm. test are also utilised. Return to normal with this test, however, appears to take somewhat longer than the time taken to reach apparent full fitness as indicated by the other investigations and clinical examination.

EXERCISES AND PROCEDURE

The main and first essential is the teaching of correct breathing. All patients who enter the surgical unit, unless critically ill, are immediately instructed in the elements of individual costal and diaphragmatic breathing, so that they are able to perform the respiratory exercises as early as possible in the postoperative period (usually the second or third day). By the use of hand-pressure, breathing with individual areas of the chest can be practised, so that if, for example, a lower lobe lobectomy has been performed, the expansion of the upper lobe is aided by exercises which have already been taught to the patient preoperatively, and are thus performed without much mental and physical effort.

With patients who have been admitted to the rehabilitation centre without having been through the surgical unit, a similar course of breathing instruction has to be given as a preliminary grade, with the main emphasis on developing expansion of the area of the chest that has been pathologically affected.

The next grade introduces shoulder and scapular movements, and side-bending and rotating movements of the chest. These are used to develop the accessory muscles of respiration and to stretch and free intermuscular and periarticular adhesions.

General fitness exercises are added with bicycle-riding, pulley-and-weight machines, punch-ball, wall bars, skipping and ball throwing. Football and goal kicking are valuable adjuncts. Later, planned runs come into the course, starting at 200 yards and working up to 2 miles or more, over a rough circular field track, with the instructor keeping constant watch.

No definite criterion can be given for changing the grade of a rehabilitation. It is only by continual observation that it is possible to estimate how fast each individual person can be pushed forward.

The instructors are trained to notice the first signs of distress in these patients, and this is particularly important when the stage of runs is reached. The pulse-rate is taken and noted before, immediately after, and 5 min. after completion of the run. The pulse-rate should have returned to approximately normal in this time if full fitness has been attained, but with the longer runs this may take up to 10 min.

As far as possible, the grades are maintained as classes, so that the competitive element can be encouraged. The courses are given during the mornings only, as it has been found by experience that these exercises can be overdone, and that morning and afternoon courses tend to induce a state of chronic fatigue which may delay final rehabilitation. In the afternoon the patients are allowed out walking through the countryside, and recreational facilities. As much entertainment as possible is provided for them. Regular visits are made by the medical officer and each patient is discussed with the sister and physiotherapist. Persistent pain, cough, increased sputum, or hæmoptysis all call for the return of the patient to the wards for further investigation and treatment.

On admission to the rehabilitation centre it is explained to the patient that every effort is being made to get him back to his original category in the Services, or to his employment in civilian life, but that these efforts can only be a guidance of his own endeavours. It is the patient who gets himself fit, the doctors and instructors merely control his efforts and advise him as to the next stage. With this point clearly established, the patients

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need no stimulation, and after 5–8 weeks have usually reached a very high standard of fitness. No definite period can be given, but pneumonia cases usually become fit in a shorter time than this, and empyema cases, particularly if of long standing, may require much longer.

It is of particular importance that rehabilitation should be started as early as possible, as the main function of these exercises is the stretching of fibrous tissue, produced by the process of repair, either intrapulmonary, pleural or extrathoracic. In order that this may be accomplished, the organisation of this fibrous tissue must be of as low a degree as possible. It is quite remarkable to see on successive screenings how the movements of the lung, chest wall and diaphragm can be increased, even though the preliminary examination may suggest a degree of adhesions and fibrosis which is likely to be permanent.

CONCLUSIONS

From study of a large group of chest cases, both medical and surgical, each of which has been under personal supervision all the time, it is felt that a rehabilitation centre can restore the major portion to a high degree of fitness in a remarkably short space of time. The essential feature, from the patient's point of view, is that something is being done to put him right. He is being guided and urged to further efforts throughout his convalescence both by the instructors and by the example of his colleagues. Quite an infectious enthusiasm is rapidly worked up by these patients and the competitive element is strong. The exercises must not be overdone as fatigue, particularly in the early stages, may soon set in. Unless the patient has fully recovered from this fatigue before the next exercises are undertaken, instead of being a pleasure they become a burden; as a result they are not so efficiently done and recovery is slowed. Rehabilitation must not be forced, it is most rapidly achieved when spontaneous.

A week's leave in the middle of the course should not be refused. It is a valuable change of surroundings, and improves the mental tone. It is striking, however, that on return from this leave the respiratory efficiency nearly always seems to have fallen. The vital capacity is less and the chest expansion and abdominal expansion have diminished. While at home they have relaxed and their muscular tone has diminished. Probably late hours have been kept. Despite this apparent setback, the leave is considered good policy, and in 2–3 days after returning they are better than they were before leaving. The week at home may be compared to the convalescent home type of treatment. Only very occasionally has a patient not returned to complete his course. Service and civilian cases are best housed apart, but there appears to be no objection to them taking their exercises together.

This centre is run by women physiotherapists, and this has been found completely satisfactory. Massage is given where necessary and ultraviolet light baths in winter time.

Improvement can be assessed during the course by clinical examination alone, and by the patient's own symptoms, but physiological investigations and exact figures are also of great value. Some of the tests undertaken in this centre may seem unnecessarily complicated and may eventually be dropped, but at a stage when rehabilitation is developing out of a very old art into a new science, they have some value.

My grateful thanks are due to Mr. H. Morriston Davies, director of the chest surgical unit, for his continued encouragement in this work. The enthusiasm of the staff of the rehabilitation centre, and in particular Miss Brunt Roberts and Miss Searle, have ensured its success. I am indebted to Mr. Harold Nevin, technician of the Department of Surgery, for his help in maintaining and operating the test machines.

Finally my gratitude is due to Dr. David Wilkie, medical superintendent of Clatterbridge Hospital, for all the facilities put at our disposal.

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SOME SENSORY EFFECTS OF WOUNDS

HAROLD BURROWS, CBE, MB, PH D LOND, FRCS
CONSULTING SURGEON TO GOSPORT HOSPITAL; CONSULTING SURGEON HM FORCES 1918–19

I. Initial Absence of Pain in Acute Injuries

NEARLY everyone knows that people who are being mauled by lions or other animals commonly feel neither pain nor fear. Their insensitivity has been attributed to hypnotism. Less generally recognised perhaps is the fact that the painlessness of acute injuries is not confined to those inflicted by wild beasts; it is a general phenomenon accompanying all sudden and violent trauma whatever its nature may be. No extreme severity is required to bring about this immediate temporary analgesia; such comparatively slight injuries as the fracture of the scaphoid bone in the wrist or the laceration of a cartilage in the knee-joint may be unaccompanied by pain at the time of infliction. Both in peace and war I have made numerous observations on the subject and these have provided no exception to the rule provided that the injury was sufficiently severe.

A few illustrative examples only need be given, because every surgeon has ample opportunity to test the matter for himself.

A youth was walking between railway lines in a dockyard when he was startled by the whistle of an engine close behind him. He leapt for safety but slipped and fell across the rails, and the engine wheels passed over both his legs. On admission to hospital he was treated with morphine and warmth, and both legs were amputated. On being asked later if he had suffered much pain he said he had felt nothing worth calling pain from first to last. I asked him if he had been scared when the engine whistled and he replied "No, there wasn't time."

On another occasion I was present when a naval officer was brought into hospital. While riding a motor-cycle he had collided with a country cart, the shaft of which had struck his abdomen. He was groaning and very near death. I asked him if he had much pain. He ceased to groan and said with a smile "None at all, but I know that it will come presently." He was given morphine and died soon afterwards from widespread lacerations of his liver, with other internal injuries. His groans would have misled an uninformed onlooker to regard his suffering as intense.

A man was accidentally shot through the stomach by a friend's revolver. He fell down immediately though he felt no pain. When I asked him why he fell down, he answered "I don't know; I supposed it was the right thing to do."

During a local retreat in Gallipoli a wounded English soldier was left lying on the ground beside a narrow path. Turks began to pass him running down the track in single file. Some of them, as they ran by, jabbed at the wounded man with their bayonets, against which he tried to defend himself with his legs. In this way he received twelve bayonet wounds, one of them penetrating the abdomen. Eventually the ground was retaken and the soldier was rescued and survived. I asked him if the stabs had caused much pain; "No," he replied, "the funny thing was they didn't hurt in the least."

Stab wounds frequently are first noticed by the trickling of blood down the skin. Wounds by projectiles commonly announce themselves immediately, though in varying ways. In the South African war a man was struck by a rifle bullet which entered his neck and escaped through his buttock, traversing a lung and a kidney in its course through the whole length of the trunk. All the man felt was a tickling sensation "such as might be caused by electricity"; it was only when he began to cough up blood that he realised that he had been severely wounded. With modern projectiles the force of the blow often seems to make the chief impression on the mind. A bullet wound which shattered the tibia a short distance below the knee caused a feeling like a mighty blow on the shin with a crowbar, though at first it was painless. Another man said that the feeling when he was shot was as though an elephant had suddenly put its whole weight on an area of his body the size of a penny—though in this instance, as in others, the sensation was not a painful one.

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As a rider to the foregoing remarks it may be stated as a rule that if a man cries out when he is hurt the wound is almost certainly not a severe one.

One of my friends was in a dugout in a railway cutting which was under shell-fire. A man before reaching shelter was hit and lay on the open ground shouting for help. My friend went to his assistance and was severely wounded through the neck. The noisy man was able to get to the dugout unaided; his wound was only a bruise of the outer malleolus of the ankle—that is to say, the kind of trifling wound which may be very painful from the first.

Another interesting fact concerning sudden and severe wounds is that the recipient cannot always identify with precision the site of his injury. During the battle of Loos an officer received a wound which removed a considerable part of his chin and jaw. He thought his nose had been shot away and decided to put a bullet through his brain. However, putting his hand to his face he found his nose was intact and he did not learn till afterwards the exact location or extent of his mutilating wound.

I had thought that the painlessness of sudden and severe injuries at the time of their receipt, and for a variable while later, was a matter of general knowledge. As, however, an appreciation of the fact does not appear to be universal, perhaps some good may be done by publishing this short note. More especially in war-time it is comforting to reflect that severe wounds are always painless until some time has elapsed after their infliction and that by the timely use of morphine the reactionary pain may be greatly and perhaps entirely prevented.

II. Reduced Sensibility and Muscular Power in Wounded Limbs

During the war of 1914–18 I specially investigated wounds of arteries and periarterial tissues in the arm and leg. During that inquiry the sensory and motor disabilities about to be described appeared to be regular accompaniments of these injuries in their early stages, even in the absence of arterial obstruction or gross damage to large nerves. I do not know if the same temporary disabilities may follow other kinds of wounds. Most of the patients were seen at a base hospital in France and more than 24 hours had usually elapsed between the wounding and the examination.

The common features of these wounds include a diminished appreciation of all cutaneous stimuli and a general muscular weakness in the affected limb. The area of reduced sensibility is of the glove or stocking type and at first may extend above the wound. In the course of days or hours normal sensibility returns in a regular manner, the proximal zones of the limb being the first to recover, the typical glove or stocking distribution of the sensory defect being maintained until even the tips of the fingers have acquired their normal sensory power. Diminished feeling of this kind has some resemblance to the numbness produced by cold and needs similar tests for its recognition. The area affected may be ascertained by needle pricks, but these must be lightly applied. Just as a hard jab penetrating the dermis will cause pain in a hand which is so numb with cold that it cannot perform the simple tasks of buttoning a coat or holding a pen, so will a deep prick be felt in a recently wounded limb.

The muscular weakness can be tested by the grip of the hand, and it may be found that, though reduced, the grasping power increases in response to vocal encouragement.

The symptoms elicited in these ways are seen to resemble those of functional as distinct from organic nervous disablement; especially characteristic are the limitations of insensitivity to gentle stimuli, its zonal distribution which is maintained during the process of recovery, and the fact that the muscular weakness diminishes under encouragement. It is not surprising, therefore, that when isolated examples are examined the symptoms are apt to be regarded as imaginary in origin. Such a diagnosis may or may not be strictly correct; but let no opprobrium be attached, for the phenomena appear always to accompany the particular wounds which I investigated, and to be independent of the recipient's mental constitution.

Concerning the cause of this condition it has been suggested that a relative ischæmia due to arterial constriction in response to irritation may be responsible. However, I have found no evidence to support this explanation and would prefer to leave the discussion of ætiology until it can be founded on ascertained fact.

III. Permanent Liability to Numbness of the Hand after Wounds of the Interosseous Tissues in the Forearm

This curious condition follows wounds which traverse the interosseous space of the forearm or penetrate the tissues near its ventral surface. The essential feature seems to be a permanent loss of adaptability in the hand to changes of external temperature. The incapacity is always less in warm weather, but even in summer the affected hand is apt to get numb with cold and in winter two pairs of woollen gloves fail to maintain digital function. On inspection the hand appears slightly swollen; in warm weather it is redder than its fellow and in cooler weather it becomes cyanosed. I have not seen a case in which the fingers when cold became pale.

On examination there has been found a reduced sensitivity of the affected hand with an incapacity for accurate manipulation such as occur in normal individuals when their hands are ischæmic with cold.

When examining pensioners after the last war I saw late examples of this disability, which had nearly always been diagnosed as "functional"; one of the men had undergone prolonged psychological treatment without benefit. Two pensioners, one a journalist, had become left-handed because of this condition in the right hand.

Every example of this disability which I have seen has been associated with a wound of the interosseous membrane or the tissues on its ventral aspect, and with such a wound, if it is more than a puncture, one may prognosticate almost with certainty the disability of the hand as here described. The condition appears to be associated with a paralysis of the small blood-vessels of the hand, and possibly may be the consequence of sympathetic nerve injury. It will be remembered that the anterior interosseous artery was originally the main arterial trunk of the forearm. Conceivably some of the sympathetic nerves of the hand still accompany this artery and the manual incapacity now being considered may perhaps be caused by damage of this nerve tract.

SUMMARY

Sudden severe wounds are at first painless.

A recently wounded limb with intact artery and nerve trunks may be weak and relatively insensitive. The distribution and mode of recovery of these defects are like those of "hysterical" or "functional" disabilities.

Wounds of the interosseous region of the forearm are apt to be followed by a permanent failure of accommodation of the hand to cold and a persistent tendency to numbness of the fingers.

MYELOGENOUS LEUKÆMIA COMPLICATING PERNICIOUS ANÆMIA

PAUL B. WOOLLEY, M B MANC

CHIEF MEDICAL ASSISTANT, DEPARTMENT OF CLINICAL RESEARCH, MANCHESTER UNIVERSITY AND ROYAL INFIRMARY

THE term leukanæmia, first introduced by Leube in 1900, still persists in textbooks and is used to designate a leukæmoid blood picture accompanied by macrocytic hyperchromic anæmia. It was considered by Jacobsohn to be a definite disease entity and many cases have been described in the German literature in support of his contention. Sinek and Kohn (1930) studied these cases and concluded that they were atypical cases of either pernicious anæmia or leukæmia. About the same time Reichel (1929) described a case of pernicious anæmia complicated by acute myelogenous leukæmia, but this was rejected by Varadi (1939) on the grounds that it was a case of aleukæmic leukæmia with hyperchromic anæmia.

In 1936 Rich and Schiff described a case which would leave little doubt as to the presence of chronic lymphatic leukæmia and pernicious anæmia in the same person; and more recently Sterne and his colleagues (1941) added a case of pernicious anæmia which was complicated four years later by subacute myelogenous leukæmia.

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In view of the rarity of the association of these two conditions and their great hæmatological interest the following case is presented.

On Sept. 14, 1932, a married woman aged 48 was admitted to the Manchester Royal Infirmary under Dr. J. F. Wilkinson, and she complained of weakness, pallor and palpitation. She was extremely weak, wandering in her speech, and her tongue was sore. The temperature was 100° F. and the pulse-rate 122. In her previous medical history she had had some "inflammation of the mouth" 7 years before, and thought she had always been anæmic since the birth of her son 22 years before. Shortly before admission, she had been unable to take any hot food and was living largely on milk and brown bread. After the loss of her mother 3 years previously, her legs and feet had begun to swell and were quite numb. Dyspnœa had become severe at that time and she had had persistent palpitation; diarrhœa had also become troublesome.

Physical examination revealed no gross abnormality, apart from a "hæmic" systolic murmur and a glazed atrophic tongue. The liver was not enlarged and the spleen was not palpable. She had a typical megalocytic hyperchromic anæmia, with definite anisocytosis, poikilocytosis, a few nucleated red cells, and reticulocytes 1·9%. Fractional gastric analysis showed achylia gastrica. At the end of a control period without treatment while investigations were being done, the blood-count was: red cells 928,000; Hb. (Haldane) 18%; colour-index 1·0; white cells 2400; reticulocytes 1·7%. Treatment with a liver extract was then begun. On the eleventh day a reticulocyte response of 62·8% was obtained and was followed by a proportional increase in the blood-count, so that on Oct. 20, 26 days after admission, her red cells were 3,900,000; Hb. 59%; white cells 5200. The differential white-cell count at this stage was normal and on Nov. 18 the red-cell count was 5,310,000. From this date until July 3, 1934, she remained very well on a maintenance dose of desiccated stomach ('Pepsac') her red cells remaining between 4,720,000 and 5,830,000, her Hb. between 92 and 115%, and her white cells between 5600 and 9400.

The patient was seen in 1937, when she was quite well, and then not again until April 7, 1942, when, although she had had liver injections at monthly intervals and pepsac, 1 oz. daily, she felt poorly and life had become a burden. She was tired, dyspnœic and had a poor appetitite, complaining of some nausea after food but no vomiting. On physical examination there was a small adenomatous nodule about the isthmus of the thyroid and a few small glands in the groin. The spleen was enlarged to 6 in. below the costal margin. A fractional gastric analysis still showed complete achlorhydria. The blood-count was:

Red cells	2,680,000	Eosinophils	2·4%
Hæmoglobin	48%	Basophils	6·6 %
Colour-index	0·92	Metamyelocytes	14·0%
White cells	85,600	Myelocytes	9·0%
Polymorphonuclears	59·8%	Myeloblasts	0·6%
Lymphocytes	7·2%	Normoblasts 6 in 500	
Monocytes	0·4%	Megaloblasts 8 in 500	

Sternal puncture revealed increased cellularity of the marrow with few mitotic figures, the count (using the terminology of Israëls, 1941) being as follows:

	%		%
Polymorphonuclears (neutrophil)	44·6	Normoblasts (total)	6·6
Eosinophils (all types)	4·4	Early 1·8	
Basophils (all types)	2·2	Intermediate 2·6	
Metamyelocytes (neutrophil)	20·4	Late 2·2	
Myelocytes (neutrophil and undifferentiated)	10·4	Megaloblasts (total)	6·6
Myeloblasts	1·4	Early 4·8	
Lymphocytes	1·2	Intermediate 1·4	
Plasma cells	nil	Late 0·2	
Monocytes	nil	Pro-erythroblasts	1·8
		Hæmocytoblasts	0·6

It is noteworthy that the presence of megaloblasts, even in small percentages, is very suggestive of a deficiency in the anti-anæmic liver principle. This picture was obviously one of myelogenous leukæmia. On April 4, 1942, she was given a course of X-ray therapy by Dr. E. D. Gray, and the blood-count on May 12 was:

Red cells	3,310,000	Basophils	0·5%
Hæmoglobin	66%	Myelocytes—	
Colour-index	1·00	Neutrophil	17·0%
White cells	44,200	Eosinophil	1·0%
Polymorphonuclears	72·0%	Basophil	0·5%
Lymphocytes	6·0%	Myeloblasts	nil
Monocytes	2·0%	Nucleated red cells	nil
Eosinophils	nil	Aniso- and poikilocytosis	considerable
		Platelets	plentiful

At no time did the reticulocytes rise above 2·8%. X-ray therapy was suspended on May 19, and she was then given three daily doses of a very potent liver preparation, the reticulocyte count rising to a maximum of 7·4%. On June 9 her blood-count showed the following:

Red cells	4,140,000	Basophils	nil
Hæmoglobin	84%	Myelocytes—	
Colour-index	1·02	Neutrophil	19·0%
White cells	26,900	Eosinophil	1·0%
Polymorphonuclears	71·0%	Basophil	1·5%
Lymphocytes	4·5%	Myeloblasts	nil
Monocytes	3·0	Nucleated red cells	nil
Eosinophils	nil	Aniso- and poikilocytosis	considerable
		Platelets	plentiful

She was discharged from hospital on June 17 and instructed to attend the departmental clinic.

DISCUSSION

The cases described as leukanæmia in earlier literature have been mostly cases of aleukæmic leukæmia or pernicious anæmia with leukæmoid blood reactions. The term should therefore not be regarded as indicating a separate disease entity and its use even for purely descriptive purposes is apt to give rise to confusion.

There is little doubt that the case here described is one of pernicious anæmia complicated by myelogenous leukæmia. Aleukæmic leukæmia could be ruled out in 1932 by the absence of primitive white cells in the blood and the complete remission after liver therapy. Again, it is unlikely that leukæmia would present itself in a neutropenic form for ten years without any significant symptoms of leukæmia during this period. Sturgis states that over 10% of the cases of myelogenous leukæmia survive from 5 to 10 years and cases have been known to survive for 16 years. However, it is extremely improbable for a patient with leukæmia to show as low a red-cell count as 928,000 red cells and 18% hæmoglobin (the original count in the case) and then survive 10 years without the necessity for either blood transfusion or X-ray therapy.

Just as the picture in 1932 was that of typical pernicious anæmia, so the changes found in April, 1942, are undoubtedly those of myeloid leukæmia. There is little doubt about the diagnosis when a white-cell count of 85,600 per c.mm. together with the presence of a high percentage of primitive leucocytes and a splenomegaly to 6 in. below the costal margin is accompanied by a reduction in the leucocytes and the size of the spleen when treated with X rays.

It is interesting to note that many cases of pernicious anæmia in relapse show a leukæmoid reaction in that primitive white cells appear in the blood. The significance of this phenomenon is not properly understood, but it is probably due to a disturbance of the maturation factor of the leucocytes.

To consider a cause for these two diseases occurring in the same patient is pure speculation. Sterne and his colleagues (1941) and Rich and Schiff (1936) suggest coincidence. Another suggestion is a constitutional predisposition of the hæmopoietic system; this case would then belong to the so-called "reactive blood diseases." Well-known examples of the latter are the cases of Wolff (1931) in which a brother and sister respectively developed granulocytopenia and acute myeloblastic leukæmia, and that of Bichel (1940) in which, almost simultaneously, acute leukæmia appeared in a brother and achrestic anæmia in a sister.

SUMMARY

A case is reported of pernicious anæmia complicated by myelogenous leukæmia.

The term leukanæmia serves no useful purpose and should be discarded.

The causation of the two diseases occurring in the same individual is unknown, but probably coincidental.

I wish to thank Dr. John F. Wilkinson, the director of the department, for permission to publish this case, and for his advice and criticism.

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ACUTE THYROTOXIC BULBAR PALSY

L. P. E. LAURENT, M D LOND, F R C P
ASST PHYSICIAN, WEST LONDON HOSPITAL; PHYSICIAN, EMS

IN the course of severe thyrotoxicosis acute muscular weakness sometimes develops. The muscles innervated by the cranial nerves are particularly involved. Ptosis, diplopia, difficulty in chewing and swallowing, facial weakness and inability to keep the head upright appear suddenly and the weakness rapidly spreads to the limb muscles. Recovery is extremely rare and survival for more than a few weeks unusual.

This condition is not well known because it is rare and perhaps because it has been described under different names. Thus Heuer's (1916) title was "Cerebral nerve disturbances in exophthalmic goitre." Cohen and King (1932) wrote of "Myasthenia gravis associated with exophthalmic goitre." Brain (1938) coined the term "Acute thyrotoxic myopathy" in the framework of an illuminating classification of muscular complications of thyrotoxicosis. Finally E. Zondek (1935) has called this complication "Coma Basedowicum."

Heuer treated a man of 23 who developed acute bulbar symptoms after 2 years of thyrotoxicosis. He was so dangerously ill that operation was limited to ligation of the superior thyroid arteries and the patient died next day of respiratory paralysis.

Brain has pointed out that Cohen and King's review included cases which would now be recognised as exophthalmic ophthalmoplegia. It seems certain that their series contained cases very similar to those I am describing. For instance, their own case, a woman of 49, after 2 years of thyrotoxicosis complained of rapidly progressive ptosis, diplopia, dysphagia, nasal voice and general weakness. She died suddenly within 12 weeks, and it is interesting to note her improvement when taking ephedrine.

Zondek's accounts are of severe thyrotoxicosis complicated by acute bulbar weakness. Coma is a terminal event and has no distinguishing features which would justify its pride of place in the title. He finds the condition more common in Palestine than in Europe and has now (1936) seen 15 cases of whom 11 died. Unfortunately he describes only 3 of them. I can find no other record of recovery and his successful treatment was too complex to throw any light on ætiology. He recommends intravenous glucose, prolan, suprarenal cortical extract, iodine and quinine. His recommendation of quinine is surprising owing to the evil action of that drug in myoneural weakness.

CASE-RECORDS

CASE 1.—A married woman, aged 37, was admitted to University College Hospital on Sept. 20, 1935. For 6 months she had suffered from increasing nervousness, insomnia, dyspnœa on exertion and œdema of the ankles. Her thyroid had been enlarged since childhood. A tuberculous cervical adenitis, at the age of 14, had cleared up without operation. Her mother and two sisters had simple goitres.

She was thin, tremulous and lachrymose; weight 5 st. 10 lb., height 5 ft. 4 in. Well-marked bilateral exophthalmos with lagging of the upper lids. Bilateral firm enlargement of thyroid lobes. Obvious tremor of fingers. Regular pulse at 100–120 per min. at rest. No dyspnœa at rest. BMR (Krogh) +80%.

She was soothed by potassium bromide gr. 60 daily, but lost weight further; on Oct. 18, 1935, it was 5 st. 3 lb. On the same day she complained of difficulty in chewing, nasal regurgitation of fluids and increase in the weakness of her limbs. I saw her for the first time on the 20th, when she had moderate bilateral ptosis, impairment of upward movement of both eyes and great weakness of orbicularis oculi. Facial movements were typically "myasthenic" and she could neither whistle nor retain fluids in her mouth owing to weakness of orbicularis oris. Her voice quickly became nasal and the soft palate did not rise on phonation. Her arms were too weak to raise a spoon to her lips and fluids were regurgitated through the nose. 'Prostigmin,' 1 mg., was given subcutaneously. Twenty minutes later ptosis had disappeared, her voice was normal and she easily swallowed a few ounces of milk. She raised her hands to her face repeatedly. The improvement lasted 3 hours, after which she relapsed to her previous state. During the next few days she could only swallow after taking prostigmin, which was given three times a day before meals. She died on Oct. 28 during sleep, 10 days after the start of bulbar symptoms.

Autopsy showed a very thin and pale myocardium. The lymphoid patches beneath the pleuræ and the malpighian corpuscles of the spleen were prominent. The thyroid was uniformly enlarged, pale, fleshy and contained very little colloid. The thymus was persistent—dark red with fleshy nodules throughout. The pituitary and suprarenal glands were normal to the naked eye.

CASE 2.—A married woman, aged 66, was admitted to University College Hospital on Nov. 25, 1935. She had had a simple goitre for 30 years but only consulted her doctor for palpitations and nervousness 2 months before admission.

She was a well-nourished woman with moderate exophthalmos. Her goitre was diffuse and nodular. The larynx was pushed over to the left. Her pulse was regular at a rate of 140 per min. Her outstretched fingers showed a well-marked fine tremor. The tachycardia and the tremor had increased strikingly during the week which preceded admission. On Nov. 28 she first complained of weakness in chewing and failure of the voice. She now had bilateral ptosis and weakness of the left internal rectus which increased with repeated use of the muscle. Her face lacked expression and drooped at the corners of the mouth. The soft palate was so weak that it allowed nasal regurgitation. The limbs were so weak that they could not be raised against the slightest resistance. Ten minutes after 1 mg. prostigmin subcutaneously the ptosis had cleared up and facial expression was normal. She swallowed fluids easily and the strength of her limbs was restored. This improvement lasted about 3 hours after which she relapsed. Her mental state was extremely restless and restraint was required to keep her in bed after prostigmin. Without the drug, despite constant efforts, she could not sit up. On Dec. 1, 3 days after the first bulbar symptoms, she died. During the last hour she was comatose and had auricular fibrillation at a rate of 200 per min. Her temperature rose to 104° F. shortly before death.

Autopsy.—A well-nourished woman with 2 inches of subcutaneous abdominal fat. Slight cardiac enlargement with a rather brown myocardium. Œdema of lung bases. The liver showed moderate nutmeg changes. The malpighian corpuscles of the spleen were larger than normal. The thyroid showed nodular enlargement with some calcification; some areas of the gland were hyperplastic and others were cystic and full of colloid. The thymus was not enlarged, only remnants being found. The pituitary and suprarenals were normal macroscopically.

DISCUSSION

The widespread and severe weakness which these patients developed acutely while under observation may be considered as a fulminating myasthenia gravis or it may be related to thyrotoxic myopathy, as Brain suggests. The response to prostigmin and ephedrine underlines its likeness to myasthenia gravis, but response of neuromuscular weakness to prostigmin is not confined to myasthenia gravis—I have seen it in a number of other conditions, and McEachern and Ross (1942) proved with myograms that it may occur in chronic thyrotoxic myopathy. The distribution of weakness and the effect of prostigmin lead to the conclusion that the myoneural junction is the site of the disturbance even if identity with myasthenia gravis is not proved. The prompt and complete relief which my patients enjoyed after prostigmin is only seen in myasthenia gravis. The beneficial effects of this drug on muscular weakness due to other disorders are never so obvious.

Final settlement of the problem must await the result of thyroidectomy, and no patient has so far survived the operation. Chronic thyrotoxic myopathy is cured by thyroidectomy, and patients with acute bulbar symptoms should also benefit if they have a similar origin. On the other hand, thyroidectomy without thymectomy has never cured myasthenia gravis. Further attempts at operation seem desirable in these desperate cases, and may perhaps be successful with the help of prostigmin. The recent work on the control of thyrotoxicosis with thiourea and thiouracil (Astwood 1943, Himsworth 1943) may well give us the best method of treatment. Meanwhile "acute thyrotoxic myopathy" is too definitive a title and has the further disadvantage that it does not give a clinical description which would facilitate recognition. The word myopathy has too long

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been used to mean muscular dystrophy. I therefore suggest that "acute thyrotoxic bulbar palsy," while it does not prejudice the ætiology of the syndrome, adequately describes its essential features and should help in its identification.

SUMMARY

Two fatal cases of acute bulbar palsy in the course of thyrotoxicosis are described.

Prostigmin relieved muscular weakness in both and may make thyroidectomy possible in such cases.

The name acute thyrotoxic bulbar palsy is suggested for the syndrome.

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Reviews of Books

Praxis der seelischen Hygiene

Editor: H. MENG. (Schwabe. Pp. 279. 18 Sw. fr.)

THE editor of this work, recently published in Switzerland, is the first holder of a lectureship for mental hygiene established at Bâle University. His own contribution is a résumé of lectures to students to whom he teaches the psychological approach to medicine. Most of it has little to do with mental hygiene, but covers those elements of medical psychology which, it may be hoped, the British student will in future be taught in his preclinical years. A long chapter on the influence of emotions on bodily functions in hypnotic experiments, however, seems to range rather far from practical mental hygiene. Another section deals with the psychology of schoolmasters as they are and as they should be. The rôle of religion in psychotherapy is discussed by Pfister of Zurich, a member of the clergy well known for his interest in psycho-analysis. In Switzerland as elsewhere, orthodox psychiatry neglects borderline cases in favour of the more severe forms of mental illness. There are, however, two notable exceptions in the contributions to this volume. Dr. Repond describes the building-up of a psychiatric outpatient, child-guidance and aftercare service in the remote mountainous canton of Valais. Struggling against both public prejudice and official mistrust he succeeded in ten years in establishing clinics in all the more important centres of the canton. Dr. Wintsch, school medical officer and professor at Lausanne University, surveys work on socially difficult children and juveniles and describes the local preventive measures, including a small special school for difficult and nervous children; a farm where slightly backward children without suitable homes are educated as farmhands; and an open colony where early offenders of normal intelligence can be trained as tradesmen, gardeners and farmers. Wintsch advocates a special penal colony for boys over 16 who have relapsed into delinquency. Careful psychological differentiation of social behaviour in young people is his chief subject and his study is a salutary answer to those who think or write in general terms of "the" cause, or hope for a universal cure, of juvenile delinquency.

Manual of Otology, Rhinology and Laryngology

(2nd ed.) HOWARD CHARLES BALLENGER, MD, FACS. (Kimpton. Pp. 334. 21*s*.)

THE call for another edition after three years indicates the steady demand forecast in our earlier review. It has increased slightly in bulk, thanks to new illustrations, and there has been some rearrangement of material, generally for the better, though it is not clear why aero-sinusitis should be included in the chapter on sinusitis in children. The rewritten description of nervous affections of the larynx is a succinct and clear account of a tricky subject. The new chapter on foreign bodies in the air-passages includes a description of the technique of tracheotomy which students should find helpful. The rest of the book has been carefully revised but contains little new material. The treatment of meningitis and thrombophlebitis resulting from aural infections is modern in outlook and lays stress on chemotherapy. Conservative measures in the relief of Menière's disease have proved rather disappointing; alcohol injection of the labyrinth, either by mastoidectomy or through the drum, can be successful and should be considered as an alternative to intracranial division of the vestibular nerve, the only method advised here.

New Inventions

A SIMPLE COLOSTOMY BELT

THE colostomy apparatus here illustrated is based on the appliances I have previously described (*Lancet*, 1936, ii, 576; 1939, i, 827).

Fig. 1 shows the complete apparatus. The cotton-elastic belt has four rubberised tabs with eyelets to fasten to corresponding studs on the abdominal plate. Adjustment is by buckle, which, in the illustration, is hidden by the small cushion that prevents it from causing discomfort. Two understraps can be supplied if desired.

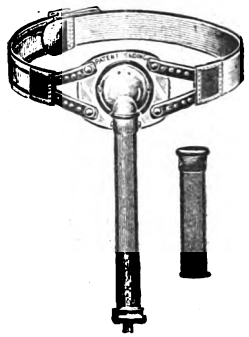

Fig. 1—Colostomy belt, with celluloid plate and dome, and alternative lengths of reservoir.

The abdominal plate is either of celluloid, for those with a suitably placed colostomy who like the feeling of support given by a rigid plate, or of rubber with a celluloid central portion. The removable celluloid dome is attached to the plate by a flanged union kept closed by a bayonet catch. A sponge-rubber washer between the flanges ensures a leak-proof joint. A cross-strap (not shown here) attached to the dome and the plate prevents accidental unlocking of the bayonet catch.

The tubular reservoir can be of any capacity up to a quart, according to length; if a long one be chosen it should be worn folded, in which case the spring paper-clip which closes the end is hooked to the belt.

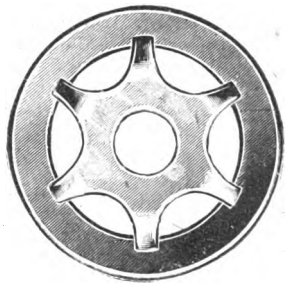

Fig. 2—Hernia or prolapse control; about half scale.

The hernia or prolapse control device (fig. 2) is of celluloid, and in profile resembles a metal trouser-button. The flat rim presses on the abdominal wall almost immediately around the gut, and thus there is no tendency for the gut to be forced through the ½-inch aperture in the centre of the device. The side windows are guarded from the gut by the projecting inner edge of the rim. This device, which is detachable and optional, has been worn without untoward results day and night for eight weeks by a patient with an incisional hernia and a moderate degree of prolapse.

For those who employ the daily irrigation technique an irrigation dome is supplied in addition to the standard one. This is deeper, front to back, than the other and has a wider outlet pipe. It also has an aperture in front in which a catheter will fit tightly, and a larger one at the top for flushing the apparatus through at intervals during the evacuation.

The advantages of this apparatus are:

1. Extreme ease of detaching, cleaning and replacing dome and reservoir without disturbing the belt.
2. Interchangeability of domes, using a single belt and plate.
3. Even the largest size of reservoir is not inconvenient in wear, yet its capacity is equal to any peristaltic catastrophe.
4. The tubular reservoir can be cleaned more quickly and thoroughly than any other type.
5. The small size of the appliance combines efficiency with inconspicuousness in wear.

The apparatus is made by Messrs. Bradley and Bliss of London Road, Reading, and has been named by them 'The Universal Colostomy Appliance.'

Wylye, Wilts. JOHN I. F. KNIGHT, MRCS.

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THE LANCET

LONDON: SATURDAY, JANUARY 15, 1944

ABSTRACT PROBLEMS

THE mass of current scientific writings has outgrown the capacity of any scientist to read all that is published even on his own subject. To help him keep abreast there has grown up a series of abstract periodicals, each on some special subject, many of which are published by bureaux which perform also other information services. The origin and growth of one of the oldest of these, the Bureau of Hygiene and Tropical Diseases, are sketched on another page by Mr. SHEPPARD, its secretary. This served as a model for the twelve Imperial Agricultural Bureaux.

There is still room, however, for more collaboration in the production of scientific abstracts. As is pointed out by the British Commonwealth Science Committee,[1] besides such overlap as that between *British Chemical and Physiological Abstracts, Chemical Abstracts* and *Science Abstracts*, there are numerous cases of duplication and overlap in more limited fields. In the medical and biological sciences the position is particularly bad and there are many opportunities of eliminating duplication of effort. On the other hand, some subjects, notably clinical medicine, remain practically unserved by any abstracting journal. According to a study made in 1937 by BRADFORD [2] and his staff at the Science Library, only about a third of the important scientific papers published each year is indexed by periodical bibliographies or abstracting journals. It is not difficult to understand how this comes about. An abstracting bureau, devoted to some particular field of science, finds that outside the small nucleus of journals in almost every issue of which will be several papers worth abstracting there are ever-widening circles of periodicals with fewer and fewer such articles until one reaches the many thousands on the outskirts, in which items of interest to the bureau appear so infrequently that it would be waste of time to look for them. To this must be added the difficulties due to little-known foreign languages and inaccessibility or ignorance of the existence of journals published in out-of-the-way countries.

BRADFORD found that the number of index references or abstracts is about equal to the number of important papers published, though only a third of these is covered. He accordingly argues that if duplication were eliminated the same expenditure of energy would produce one reference or abstract for each paper. His solution is that all available periodicals should be allocated to the various bureaux, according to their subjects, and that each bureau should index every original article in these periodicals. The titles of unwanted articles should be passed to a central clearing house which would redistribute them to the appropriate bureaux. Thus each bureau would receive the titles of all articles on its own subject, even though these appeared in periodicals that would not otherwise have been scanned. Periodicals too general in scope to be allotted to any bureau would be indexed by institutions of more general scope. To facilitate the redistribution of the titles BRADFORD advocates the use of the Universal Decimal Classification (UDC). A somewhat similar solution is proposed by POLLARD.[3] He suggests an International Information Council (like the one foreseen by H. G. WELLS in his *Shape of Things to Come*) linked to national information committees, and under each of these a chain of information bureaux. The essential feature of his plan is that the national organisation in each country shall deal exclusively with the work published in that country. The publications of each country would be procured by the national information committee, roughly classified by some standard international scheme, such as the UDC, and distributed to the bureaux. If each bureau were assigned the classification number of its subject, the distribution by means of these "bureau numbers" would become automatic. Publications not wanted by a bureau would be roughly classified and sent to the correct bureau for action. The bureaux would prepare the MSS of the references, which would be printed on international standard cards by the national committee. Copies of the cards would then be distributed by the bureaux to their opposite numbers in other countries. Each bureau would thus be able to build up a card index to the current world literature on its own subject.

In considering these proposals, we must first distinguish between overlap and duplication. No two bureaux, within the same country or other linguistic unit, should attempt to cover the same field of knowledge, but it is by no means desirable to eliminate all duplication in abstracting, as suggested by BRADFORD. Each bureau should have its abstracts prepared by experts in the particular subject from the point of view of that subject, and the same paper may well need to be abstracted from two or three different angles by as many bureaux. What is significant for one worker may be unimportant for another. The use of UDC numbers would in itself indicate this, for the part of the number after the colon often indicates that a paper is of interest to readers in quite a different branch of science. There is a danger that, when we have assigned the appropriate classification number to an article, we shall imagine that there is no need for further scrutiny of that article. In fact no classification scheme can completely account for all the intricate interrelations of subjects as they occur in periodical articles. Moreover, anyone familiar with the actual work of classification knows how often even experts will assign different numbers to the same article. POLLARD'S hope that the distribution of references to the bureaux will be rendered automatic by the use of UDC numbers is therefore doomed to disappointment. Such work, if it is to be done properly, can never be automatic, but will require a high degree of knowledge and intelligence; it could not in fact be done from the titles alone, which are often misleading, but would need an examination of the original article by an expert. We must not, then, run away with the idea that any scheme, however carefully thought out, will ensure that no important items are overlooked. To take one of POLLARD'S own examples, it is very doubtful whether MENDEL'S epoch-making work would have escaped temporary oblivion, even had there been an efficient system of

1. Cited in *Nature, Lond.* 1943, **152**, 29.
2. Bradford, S. C. *Proc. 14th Conf. ASLIB.* 1937, p. 59.
3. Pollard, A. F. C. *Nature, Lond.* 1943, **152**, 541.

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indexing in force at the time. It would no doubt have been recorded under the standard classification number for "peas" and perhaps also for "hybridisation." But how many indexers in 1866 would have thought to record it also under the topic where its real significance lies—the mechanism of heredity? Would there indeed have been any place for such a topic in the standard classification of 1866?

Such comments are in no sense arguments against the proposals of BRADFORD and POLLARD; they are made only as a warning against expecting too much from any such scheme. Something of the sort is long overdue and must be adopted sooner or later. Now, when postwar reconstruction and planning are in the air, is an appropriate time to be considering the matter. It is important that any plan should make full use of existing organisations that have grown up in response to a felt need and are founded on long experience. This point is stressed by SHEPPARD and is fully recognised by POLLARD, who indicates ways in which his proposed organisation could be built up piecemeal on existing institutions.

WOUND ANTISEPTICS

CHEMICAL disinfection of wounds in its modern form began with Lister's introduction of phenol, which, although it prevented sepsis and gangrene, was soon found to cause extensive injury to the tissues. After that, many other compounds were developed, and during the 1914–18 war they were given a lengthy trial on the vast number of wounds then available. The general opinion was that attempts at chemical disinfection usually did more harm by injury to the tissues than good by suppression of bacteria. Yet although this opinion seemed well founded, the present war has seen its almost complete reversal, and now once again antibacterial compounds are widely applied to wounds. Much of the change has been due to the application of sulphonamides for this purpose. Jensen, Johnsrud and Nelson[1] showed that the infection-rate of compound fractures was considerably diminished by the local use of sulphanilamide, and Colebrook and Francis[2] demonstrated that wounds infected with hæmolytic streptococci (formerly the most dangerous invaders of wounds) could be freed from the organisms by the same means. Since then, the use of sulphanilamide has been widely adopted; although Hawking's[3] work suggests that sulphathiazole would probably be more effective. Simultaneously, the acridine compounds have been brought back into favour, first by the demonstration of Russell and Falconer[4] that 1% solution of proflavine sulphate is a non-irritant antiseptic for brief application to the brain, and secondly by the recommendation of Mitchell and Buttle[5] that wounds should be dressed with proflavine powder. Considerable evidence, both experimental and clinical, has accumulated to show that proflavine is effective in diminishing bacterial infection of wounds. Another type of compound for the same purpose has been introduced in propamidine.[6] Finally, penicillin has been applied to wounds with remarkable success, as H. W. Florey and Cairns have reported from the Mediterranean front and M. E. Florey and R. E. O. Williams confirm from Birmingham in this issue, but its wider use is still prevented by shortage of supplies.

The power of all these compounds to diminish the bacterial population of wounds is generally admitted, especially in so far as streptococci are concerned, but there has been less agreement about their innocuousness for the tissues. The sulphonamides may possibly delay the healing of clean wounds—experimental work in Boston[7] suggest that they do not—but in infected wounds this effect is negligible compared with the damage caused by bacteria. Proflavine is definitely less innocuous, and its application as a powder to experimental wounds causes necrosis of the surrounding tissues; accordingly its use in this form has been questioned.[8,9] The subject has been reinvestigated by Selbie and McIntosh,[10] who injected 0·1 or 0·2 c.cm. of solutions of various antiseptics into the thighs of mice and examined the histological effect on the tissues. They found that only slight necrosis of the muscle and slight connective-tissue reaction were caused by sulphanilamide or sulphathiazole (40 mg.) or by calcium penicillin (5 mg.). Limited necrosis of the muscle and mild connective-tissue reaction was produced by proflavine sulphate, 2-7-diamino-acridine hydrochloride or 5-amino-acridine hydrochloride (0·5 mg. injected as 0·5% solution). The bases of these acridine compounds however caused extensive necrosis of muscle; and propamidine in the same dose caused very extensive necrosis. (When applied as a powder, little difference in toxicity between proflavine base and its various salts had been noticed by Hawking.[9]) Since other workers[6,8] had found proflavine powder to be so toxic, Selbie and McIntosh paid special attention to the effect of a mixture of sulphathiazole (99%) and proflavine sulphate (1%), which they had previously recommended as a prophylactic application for wounds. When 10 mg. of this mixture was inserted under the skin of rats, the local necrosis and the reaction of the tissues were only slightly greater than those produced by sulphathiazole alone. Presumably this absence of damage is due to the smaller amount of proflavine present (only 0·1 mg.) compared with that used by previous workers. This combination of sulphathiazole and proflavine is now in clinical use. Mitchell and Buttle,[11] writing from the Middle East, mention a small series of wounds treated with the mixture which were closed up and healed by first intention, and McIntosh and Selbie[12] report that it has led to rapid clearing up of infection in many wounds treated in this country. The former say that, for open wounds which are infected with staphylococci or are purulent, proflavine, in quantities not exceeding 0·5 g., is the best local application excluding penicillin. The latter maintain that a mixture of drugs will be needed for the prevention and treatment of wound infection unless some single drug is found to be active against all types of organisms. Paul Goedrich, of New Jersey, makes such a claim for three new sulphonamide compounds containing iodine, but they have yet to be tested on

1. Jensen, N. K., Johnsrud, L. W., Nelson, M. C. *Surgery*, 1939, **6**, 1.
2. Colebrook, L. and Francis, A. E. *Lancet*, 1941, i, 271.
3. Hawking, F. *Ibid*, 1942, ii, 507.
4. Russell, D. S., Falconer, M. A. *Proc. R. Soc. Med.* 1940, **33**, 487.
5. Mitchell, G. A. G. and Buttle, G. A. H. *Lancet*, 1942, ii, 416.
6. Thrower, W. R. and Valentine, F. C. O. *Ibid*, 1943, i, 133.
7. Jones, C. M., Bartlett, M. K., Ryan, A. E. and Drummey, G. D. *New Engl. J. Med.* 1943, **229**, 642.
8. Russell, D. S. and Falconer, M. A. *Lancet*, 1943, i, 580.
9. Hawking, F. *Ibid*, 1943, i, 710.
10. Selbie, F. R. and McIntosh, J. *J. Path. Bact.* 1943 **55**, 477.
11. *Lancet*, 1943, ii, 749.
12. *Ibid*, Jan. 8, 1944, p. 66.

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wounds, and no details of his experimental findings have yet arrived here.

As a supplement to their work with antiseptics, Selbie and McIntosh [10] have investigated the action of excipients on the tissues of a wound. Contrary to expectation, many of the excipients tested were definitely toxic. Thus well-marked necrosis of muscle and connective-tissue reaction were caused by methyl cellulose (0·2 c.cm.; 5%), glycerol (0·1 c.cm.; 50%) and tragacanth (0·1 c.cm.; 2·5%). The injection of castor oil, promulsin, lanette wax and gelatin produced only a limited necrosis of muscle but a considerable connective-tissue reaction; whereas acacia, propylene glycol and liquid paraffin caused no necrosis but often an equally severe connective-tissue reaction. Similar findings with oils in wounds have been reported by Hawking,[11] who found that although many oils did no immediate harm to the tissues they provoked undesirable connective-tissue reactions if allowed to become embedded in a wound; cod-liver oil was particularly bad in this respect, liquid paraffin was moderately bad, while cotton-seed oil was almost inert. The right treatment for human wounds cannot be decided by studying experimental wounds alone, but these observations deserve the surgeon's consideration.

CHEMOPROPHYLAXIS OF CEREBROSPINAL FEVER

IT has been known since the experiments of MEEHAN and MERRILLEES [14] and of FAIRBROTHER [15] in 1940 that carriers of meningococci can be at least temporarily freed from these organisms by a short course of sulphapyridine in moderate dosage. The difficulty has been to apply this knowledge effectively in practice. It is obviously undesirable to give prophylactic courses of sulphonamides indiscriminately and useless to do so in an open population where chances of reinfection are considerable. A closed community, such as a residential nursery or school threatened by an outbreak offers ideal conditions for such an experiment in prophylaxis, and convincing success, albeit on a small scale, has been recorded under such conditions.

KUHNS [16] and his US Army colleagues now record a large-scale and strikingly successful prophylactic trial of sulphadiazine in more than 15,000 soldiers stationed at two posts where cerebrospinal fever was particularly prevalent during the spring of 1943. At the first post a new division of recruits, mostly under 20 years of age, were barracked in three geographically and functionally separate areas of the camp. In one of these were the 8000 men selected for prophylactic treatment. Among these there had been 28 cases of meningitis during the four weeks previous to the experiment. The untreated controls were the remainder of the division, 9300 men, living in the other two demarcated areas. Among these there had been 21 cases of meningitis in the previous four weeks. Just before the experiment was undertaken the carrier-rate in 100 men selected at random in each group was found to be 36% in the treated and 38% in the control group. The predominant meningococcus found in each instance was group I. On March 22–24, all men in the treated group were given 1 g. sulphadiazine by mouth three times daily at meal times. Thus each man received 9 g. of the drug. In the subsequent eight weeks the treated group had no cases of meningitis, and carrier-rates ranging from 2% to 7%; the untreated group had 23 cases of meningitis and carrier-rates of 30–57%. Toxic effects of the drug necessitated withdrawal from duty of only 2 men with generalised skin eruptions, but questioning at random indicated that minor degrees of headache, dizziness, visual disturbance, lassitude, tinnitus and nausea had occurred among about 10% of the men. These symptoms were insufficient to interfere with the training of the troops. In the second experiment, 7000 functionally separate men, with a carrier-rate of 30%, were treated simultaneously and compared with 9500 untreated controls with a carrier-rate of 29% and living under similar conditions. In this case the amount of drug given to the treated men was reduced to 2 g. daily for two days—1 g. at breakfast and 1 g. at supper on April 7–9. The results in this experiment were just as good as in the first. In the treated group, during the eight weeks after the experiment, there were 2 cases of meningitis (both in men who were away from the camp and may have been reinfected elsewhere) and a carrier-rate of 0–2%; in the untreated group during the same period there were 17 cases of meningitis and carrier-rates of 29–43%. Sulphadiazine blood-levels in 20 cases at periods up to eight hours after the last dose ranged from 2·7 to 5·4 mg. per 100 c.cm. No toxic effects were observed.

These well-planned experiments indicate clearly that as little as 2 g. of sulphadiazine daily for two days will stop outbreaks of meningococcal disease provided that the drug is administered to all at risk simultaneously, and that the treated group forms virtually a closed community. No opportunity should be missed of putting this method of prophylaxis into practice when a combination of two factors are present: (1) rising or even slowly falling incidence of meningococcal disease, and (2) a closed or semi-closed community in institution, school, ship, camp or elsewhere. Sulphadiazine, with its relatively high rate of absorption and slow excretion may be the best drug for the purpose, but sulphathiazole, even though rapidly excreted, is so powerful and so non-toxic in small doses that it may also be effective even when given only twice daily.

13. *J. Path. Bact.* 1943, **55**, 41.
14. Meehan, J. F. and Merrillees, C. R. *Med. J. Aust.* 1940, ii, 284.
15. Fairbrother R. W. *Brit. med. J.* 1940, ii, 859.
16. Kuhns, D. M., Nelson, C. T., Feldman, H. A. and Kuhn, L. R. L. *J. Amer. med. Ass.* 1943, **123**, 335.

AT LINCOLN'S INN FIELDS

ON March 25 the Faculty of Radiologists will move its headquarters from 32, Welbeck Street to 45, Lincoln's Inn Fields, premises belonging to the Royal College of Surgeons of England. They will have as companions there the Association of Surgeons, the British Orthopædic Association, the Association of Anæsthetists, the British Association of Oto-Laryngologists and the Council of British Ophthalmologists. All these associations will have a joint secretariat. The *British Journal of Surgery* also will have an office in the building. For larger gatherings than their own rooms will hold, the Royal College is offering hospitality in its own house, next door but one. The project will rejoice all who have hoped for closer union between specialist groups and the parent body of general surgery. We may indeed hope that the habit of living together will extend yet further afield.

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Annotations

A MUSEUM IN THE MAKING

To have ample space and funds and an enormous and valuable collection to classify is evidently a curator's paradise. Dr. S. H. Daukes, who discussed his task of arranging the new Wellcome museum at the section of the history of medicine of the Royal Society of Medicine on Jan. 5 roused pangs of envy in the distinguished breasts of the many museum workers who had come to hear him. Henry Wellcome was a generous buyer: he used, Dr. Daukes said, a net rather than a rod and line; and when he died no-one had a very clear idea of what kind of museum he had meant to found. Dr. Daukes however is acting on the assumption that he wanted a medical historical museum and is selecting material from the collection with that end in view. Many of the stored packing cases have not been broached yet, but already considerable treasures have come to light. Some ancient medical and botanical texts, all in superb condition, on view at the meeting, moved Dr. Ashworth Underwood to remark that only 17 of the 41 displayed were in the RSM library and only 18 in that of the Physicians. The new museum is to be housed above the Wellcome Museum of Medical Science in Euston Road, and will be linked up with it. If it is to serve its proper ends of education and research, Dr. Daukes said, it must include plenty of instructive labels illustrated by carefully selected specimens, and also provide a storehouse of material for special investigators. He has decided to follow a scheme which is partly cultural and partly chronological. In ten large halls the evolution of medicine is to be traced through primitive and early cultures Egypt, China, India, and Persia, to Greece; through Greco-Roman, Byzantine, Medieval and Renaissance medicine, and modern medicine in the 18th and 19th centuries, to our own day. One hall will cover the history of diseases. Each hall will be arranged roughly on the same plan—in each bay a single subject (as medicine, surgery, pharmacy), plenty of explanatory labels, summaries kept up to date, and files of classified cuttings. A handbook will provide an outline of medical history. Pharmacies reconstructed for the different periods will form "arrest" exhibits to attract attention. Students will be able to move portable tables and chairs into the bays and to work quietly there, and they can lock up material on which they are working from day to day. The library occupies a large hall at the end of each floor, connected by a separate staircase; on each floor there is a well-equipped lecture-room with lantern and epidiascope, and of course a private room for an official. Sir John Forsdyke, director of the British Museum, mentioned that Henry Wellcome's interest in archæology, which went well beyond medicine, and had already benefited the national collection; and he encouraged Dr. Daukes to pass on what he did not need to other collections. Dr. Foster-Cooper, director of the Natural History Museum, remarked that much of the curator's time is expended on problems of paper, glass and nails. The central show cases in a hall can well be used for temporary and changing exhibitions; on his own territory, he was looking forward to getting rid of his perennial elephants.

MITOSIS AND CANCER

CONTROL of mitosis may sound like an open sesame to the control of cancer. If this were so, how simple it all might be! Many agents are available and elegant methods for studying them; yet these methods themselves reveal the flaw. The effects of colchicine, ether, cocaine and ephedrine on mitosis in normal corneal epithelium have been accurately estimated.[1] Not until our open sesame is qualified by a certain definite specificity or selective action is cancer likely to benefit from this control. No master key, but a very special one is required. Nothing is more certain than the possibility of arresting the growth of every tumour by means of agents that arrest or control cell division. It is just as certain that the problem of treating cancer has been solved by none of these. Tumour and host still suffer the same control. Both may be severely poisoned and both may die. Until some agent is discovered which penetrates and kills, or arrests division, of malignant cells alone, hopes founded on a generalised chemical control of mitosis[2] or on regulation through histone[3] are vain, though the new information concerning control is extremely valuable to general biology. Experience with the tumour-destroying or mitosis-controlling agents which have so far been found supports this view. Colchicine, which arrests mitosis in metaphase, fails to distinguish between a normal cell and a malignant one. X rays and radium destroy both tumours and normal tissue. Most present-day research with these physical agents is directed towards the discovery of a selectively lethal dose and the precise localisation of dose to tumour, just as the surgeon defines the limits of a growth and destroys it by excision. These measures may solve the fate of growths in sites which are accurately known—and they often do—but for hidden metastases it seems that only intravenous specific selective therapy will avail to find and cure them. Specific it must be.

1. Buschke, W., Friedenwald, J. S. and Fleischmann, W. *Bull. Johns Hopk. Hosp.* 1943, 73, 143.

AVIATOR'S ASTRAGALUS

INJURIES of the astragalus are rare in civil practice—the average orthopædic surgeon deals with probably one or two a year. But in flying crashes they are fairly common. Graeme Anderson[4] first noted this peculiar liability of flying men in 1919 and called the lesion "aviator's astragalus." He personally collected 18 cases. In the industrial accident the man falling from a height hits the ground, and if he lands on his feet the impact is taken by his heels and he sustains a fractured os calcis. In an air crash it is the instep of the pilot's foot resting on the rudder bar that receives the impact. The foot is thus violently dorsiflexed, and the anterior edge of the tibia acts as a knife, shearing through the neck of the astragalus. The momentum carrying the pilot forward continues to dorsiflex the foot, which is dislocated at the subastragaloid joint. In its severest form the continued dorsiflexion brings the tuber calcanei in front of the body of the astragalus, in which position the os calcis and the projecting medial tubercle of the astragalus lock, jamming subsequent attempts at reduction. Moreover, with the return of plantar flexion of the foot, the jammed astragalus becomes levered backwards, completely out of its tibiofibular mortice. This mechanism and the classification and management of such injuries are described by Watson-Jones[5] in the new edition of his book, and were discussed at the October meeting of the British Orthopædic Association by Coltart,[6] who had studied 75 RAF cases. It is important to realise that the apparently simple fracture of the neck of the astragalus is almost invariably associated with some degree of dislocation at the subastragaloid joint, which must be corrected if a satisfactory result is to be obtained. Reduction is secured by plantar flexion of the foot. Watson-Jones, who directed the RAF survey, emphasises that there must be full plantar flexion and full eversion, and he maintains that there is no danger in immobilising fracture-dislocations of the neck of the astragalus in full equinus and eversion. The displacement is prone to recur unless plaster fixation is maintained for at least

2. Thomas, P. T. and Drew, R. *Nature, Lond.* 1943, 152, 564.
3. Stedman, E. and Stedman, Ellen, *Ibid*, p. 566.
4. Anderson, H. G. Medical and Surgical Aspect of Aviation, London, 1919.
5. Watson-Jones, R. Fractures and Joint Injuries, Edinburgh, 1943.
6. Coltart, W. D. see *Lancet*, Nov. 27, 1943, p. 670.

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8 weeks, by which time the fractured neck will have united. A fracture-dislocation with displacement of the rotated body of the astragalus backwards out of the ankle-joint presents an alarming X-ray appearance, and must be treated as a surgical emergency. It is of the utmost importance to reduce the body of the astragalus at once, otherwise the tensed overlying skin will slough, and a septic arthritis of the ankle result. Air crashes do not necessarily happen near RAF hospitals; and, as Watson-Jones indicated to the BOA meeting, although the RAF make every effort to transfer their injured men to their own hospitals as soon as possible, they hope that whatever hospital receives such an emergency will attempt the earliest possible reduction. Skeletal traction through the os calcis has proved a helpful aid to reduction by widening the tibiocalcanean gap, and is used whether reduction is by closed manipulation or open operation. At operation a posteromedial incision is recommended, and by thrusting a lever between the sustentaculum tali and astragalus they are unlocked and the astragalus can be pushed forward. Every effort must be made to preserve the astragalus, for the results of its excision have not been good; the only indication for its removal is serious infection. In almost every case, after reduction of a dislocated body avascular necrosis occurs. In the past the increased relative density has then been mistaken for a missed compression fracture of the body. Regeneration of the bone will take place during long-continued immobilisation in plaster (it may take as long as 37 weeks). After regeneration, the immediate functional results have been excellent. When regeneration has not occurred, arthrodesis of the ankle or of the subastragaloid joint, or even of both the ankle and the subastragaloid joints, has produced good results. Watson-Jones advises a tibiocalcanean fusion and inserts a graft via a tunnel through the body of the astragalus.

SYMPATHETIC OPHTHALMIA

IN the wars of the last century, between a quarter and a half of all perforating eye injuries developed sympathetic ophthalmia,[1] whereas in this war and the last the condition has been rare. The cause is still unknown, and the decline in frequency must be ascribed to better surgical methods and aseptic technique. Many surgeons say that sympathetic ophthalmia is a specific infection, and certainly two factors point to this—that it does not develop in the presence of frank pus which would probably destroy the organism, and that the missiles of modern warfare are usually aseptic owing to their high velocity. It is rightly taught that an eye with a perforating injury should be excised if it cannot again become a useful organ of vision. This is a useful axiom to remember, but it will not help the surgeon in a difficult case, for sympathetic ophthalmia does not usually arise in eyes severely smashed by bullet wounds or shell splinters but in those in which there has been a puncture of the globe in the ciliary region with little or no deterioration of vision. It is not justifiable to remove such eyes provided they make a good recovery, for only about one in a hundred of them will cause sympathetic ophthalmia in the other eye,[1] and in war injuries, since the missiles are aseptic, the incidence will be less than this. Thus in Sir Arnold Lawson's records of war blindness at St. Dunstan's in the last war, among nearly 2000 blinded men from all the Services, only 4 cases of sympathetic ophthalmia were seen. It was his experience that, while it was safer to remove an eye shattered by bullet or shell splinter, in patients where this was refused no trouble ever arose. In not one of the 4 men affected was the injury which caused the sympathetic inflammation due to a war missile; it followed injury from a rifle butt, a motor-car or a piece of porcelain insulator, or, in the last case, surgical removal of a traumatic cataract. No details of cases in this war have so far been published, but Wienman[2] records 4 seen in civilian practice. One of the patients was knifed in the eye, one struck with a fist, one with a "blackjack" during a hold-up, and one by a base-ball. He emphasises that the only good treatment is prophylaxis, but his statement that 17% of badly injured eyes, if not removed, will lead to sympathetic ophthalmia, will not find general acceptance.

1. Duke-Elder, W. S. Textbook of Ophthalmology, London, 1940, vol. III, p. 2327.

WHEN HOSTILITIES CEASE

A COLLECTION of papers prepared for the Fabian Society appears under this title.[3] Contributors are Julian Huxley on relief and reconstruction, Harold Laski on the machinery of international relief, W. Arnold-Forster on international controls, J. R. Marrack on food for starving Europe, Aleck Bourne on postwar medical relief, John Hammond on relief and agriculture, and Kenneth Brooks on the re-establishment of displaced peoples. There is also a foreword by Philip Noel-Baker and an introduction by Leonard Woolf. All the authors have thought about their problems, and are worth reading. First relief—then reconstruction—and finally peace. None of them belittles the difficulties facing us, but all agree that this is the time for us to show our greatness. The world must be re-established on a basis of international coöperation by which prosperity and security will be enhanced and the chances of war will be reduced to a minimum. There must be no use of relief for political purposes or reconstruction to further the interests of "big business." There must be no relaxation of rationing till the world is fed.

There are brave words in this book. Many will not agree with all of them, but all should be prepared to think seriously about many of them. Yet even these writers do not perhaps display clearly enough the greatest obstacle the world has got to overcome. Voluntary submission to control involves sacrifices of individual liberty; international submission involves national sacrifices. Are we prepared to make them? Are the United States—and Russia? We wonder, but we hope.

AMINOPHYLLINE

A tab. aminophylline, gr. 1½, appears in the new edition of the National War Formulary. Many therapeutic actions have been claimed for this drug (also known as theophylline and ethylenediamine, 'Euphyllin,' 'Metaphyllin' and 'Cardophylin')—diuresis, cardiac stimulation, coronary dilatation, cerebral stimulation, bronchial dilatation and peripheral vascular dilatation. Not all of these have been proved, but its diuretic effect, as with another xanthine derivative, caffeine, cannot be denied. Boyer[4] regards its diuretic action in cardiac œdema as amply confirmed, though not in other forms of œdema. It is in general much less powerful than the injected organic mercurial diuretics, though perhaps more useful when given by mouth, so long as gastric irritation does not arise. Apart from the beneficial effect of reducing œdema there is only scanty evidence that it stimulates the heart, and a claim that it lessens cardiac dyspnœa does not accord with its known stimulant action on the respiratory centre. This last effect can be used to abolish Cheyne-Stokes breathing if it is distressing, and the drug is also advocated for preventing postoperative pulmonary collapse. On its value in the treatment of anginal pain much has been written for and against. The earlier work in animals, suggesting that the drug reduced the area of ischæmia after a coronary ligation, has not been confirmed, and it is now believed that the increase in coronary flow is merely a consequence of the myocardial stimulation and no greater than that called

2. Wienman, G. J. *U.S. Naval med. Bull.* 1943, **41**, 1392.
3. When Hostilities Cease. Gollancz. Pp. 124. 4*s.* 6*d.*
4. Boyer, N. H. *J. Amer. med. Ass.* 1943, **122**, 306.

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for by the extra work of the heart. The more important clinical studies have given contradictory results. It is probable therefore that if aminophylline has any effect on the cardiac pain it is not great. Boyer regards it as useful in the treatment of bronchial asthma when adrenaline fails to relieve, though in most cases adrenaline is much more effective. No action has been demonstrated on hypertension and the ischæmic conditions of the extremities.

PLANTAR WARTS

THE plantar wart is becoming much commoner, and although many forms of treatment have been devised, none is wholly satisfactory. X rays and radium carry a risk of producing severe burns on the sole of the feet because of the relatively large doses that have to be employed. More successful is curettage under a local or general anæsthetic; but sometimes the wart recurs, particularly if some small part of it is left, and the period of healing may be long and painful. It is therefore encouraging to hear of this troublesome condition yielding to the simple procedure of soaking in a 3% solution of formalin. Sydney Thomson [1] records success in 39 cases, some of which had not responded to other remedies. His technique is to put the formalin lotion into a doll's saucer and rest the affected part of the sole in it. This prevents the thin skin on the top and sides of the foot being wetted—an important detail because a formalin solution of that strength is irritating to the soft skin on the other parts of the foot. The warts are soaked thus for 10 minutes each night, and in most cases a cure is said to be complete in 3 or 4 weeks.

SENSATION AND THE CORTEX

BY arranging small electrodes over the sensory cortex of the brain, the minute action potentials set up by stimulation of single hairs or single touch endings can be picked up. Similarly, stimulation of special receptors in the eye, ear and nose cause localised electrical changes in the appropriate areas of the brain. During recent years groups of workers have been busy mapping out the exact areas of sensory representation on different species by this means. Marshall, Woolsey and Bard [2] have explored the sensory cortex, Bremer [3] the auditory, and Bartley and Bishop [4] the visual areas. In the Sharpey-Schafer lecture on sensory areas in the brain given earlier in the year, Adrian [5] compared the position and extent of representation of superficial sensation on various animals. Since then he has described his work in greater detail.[6] The results he obtained were very different in sheep, goats, pigs and ponies. In the goat and sheep most of the sensory cortex was concerned with messages received from the lips, the feet having some representation and body hardly any. In the pig the snout had an enormous representation—relatively greater area for area than has the human hand—while the body seemed to have no representation at all. The distribution in the pony was like that in the sheep and goat. It seemed that the detailed representation of the snout area, at the expense of the rest of the body, was a reflexion of the unimportant place of the limbs, which are simply used for locomotion and posture, while the snout is used for scenting, feeling and manipulating food. A fascinating difference between the species was found in the side of the brain on which the senses had their representation. In the sheep and goat, touching the lips caused discharges on the same side of the brain, while in the pig and pony the discharges were in the opposite hemisphere. In all, the limbs were represented on the opposite side. It will be remembered that the primitive olfactory system is entirely uncrossed, while the most highly developed visual system is crossed. Adrian makes the ingenious suggestion that in sheep and goats absence of crossing is due to the dominance of smell rather than of sight as a guide to feeling, whereas in the pig and pony the receptors around the nostrils are used for tactile exploration in conjunction with vision. Thus in the first group snout sensation is uncrossed and in the second crossed, in order to facilitate the coördination of the important sensory mechanisms. Supporting this idea is the observation that in carnivora and rodents the impulses from the mouth area cross the mid-line to conform with those from the eyes. The diagrams with which Adrian illustrates the relative representation of lips or snout, limbs and bodies in these animals show an enormous preponderance of the snout area, in contrast to the position in man, in whom the tongue and the hands, particularly the thumb and index fingers, usurp so much of the sensory cortex from the rest of the body. Adrian points out how valuable it would be to examine the cortical discharges of animals who have specialy developed receptive areas, and he looks longingly to the elephant's trunk, which has highly developed tactile and motor powers, and which presumably has a correspondingly large cortical representation.

1. *Brit. J. Derm. Syph.* 1943, **55**, 267.
2. Marshall, W. H., Woolsey, C. N. and Bard, P. *Science*, 1937, **85**, 388.
3. Bremer, F. *C.R. Soc. Biol., Paris*, 1938, **130**, 257.
4. Bartley, S. H. and Bishop, G. H. *Amer. J. Physiol.* 1933, **103**, 159.
5. Adrian, E. D. *Lancet*, 1943, ii, 33.
6. *Brain*, 1943, **66**, 89.

PRISONERS IN HOSPITAL IN GERMANY

ONE of the hardest trials of a prisoner-of-war is enforced inactivity. Most prisoners are—at any rate at first—unable to occupy their time by pursuing the craft or trade on which they depended in their previous civil life, and the professional soldier is if possible even more thoroughly deprived of his normal activity. From this point of view the medical officer assigned to a German hospital for prisoners might be supposed to be in a happier plight than his fellows. He has the consolation that among them he can still employ his time and make himself useful by carrying out his usual duties. But this consolation is lessened by the deficiencies of some of the German hospitals for prisoners-of-war. The Geneva Convention lays down that the drugs and equipment of such hospitals must be provided by the belligerent in whose country the hospital is situated, but the Germans do not maintain an adequate standard. The two repatriated medical officers, Major J. H. T. Challis and Major G. C. Steele, who recounted their experiences to the Royal Society of Medicine on Jan. 7, told of the almost complete absence, for example, of anæsthetics. Proper modern appliances were of course out of the question, as was premedication; but there was not even a sufficiency of ether and chloroform or of the means of their administration. Food too was so poor and scanty, consisting mainly of potato soup, that wounds healed only slowly, until at last Red Cross parcels arrived. The difference in healing-power was impressive as soon as the patients had something like enough nourishing food.

These medical officers were struck by the morale of our prisoners. Hardships aroused all their fighting spirit and the worse they were treated the more they resolved to keep cheerful and not to give in.

CAPITATION FEE 10s. 6d.

JUST before the turn of the year the Minister of Health had his first meeting with members of the Insurance Acts Committee and offered a war-time bonus of 9d. to insurance practitioners, dating from Dec. 1 and bringing up the capitation fee to 10s. 6d. The bonus would be irrespective of income and carry a corresponding increase in the mileage grant. On an assurance that the basic capitation fee would be reconsidered after the war the committee, after deliberation apart, decided to accept the offer.

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Reconstruction

ORTHOPÆDIC SURGERY AND THE FUTURE[1]

HARRY PLATT, MS LOND, FRCS
PROFESSOR OF ORTHOPÆDIC SURGERY IN THE UNIVERSITY OF MANCHESTER

To attempt to predict the future is one of the great adventures in ideas. We may not reach our destination, but the journey is often an exhilarating exercise.

The future of orthopædics must be sought in the wider context of the science and practice of medicine as a whole. We are moving rapidly into the intellectual climate of the technological age, with its emphasis on the conception of science as the child of society, whose primary purpose is to contribute to an expanding human welfare. This notion is regarded by many as a challenge to the older tradition of a free science claiming the right to pursue—in the words of A. N. Whitehead [2]—"an active interest in the simple occurrences of life for their own sake." It seems likely that this challenge will always be taken up, and we need not fear that an evolving society will fail to welcome the special contribution of abstract research whose concern is not the immediate satisfaction of material needs. We see a striking illustration of the concept of the instrumental rôle of science in the affairs of medicine today. In the Beveridge report applied medical science, in the form of a comprehensive medical service, is set within the framework of social security. But we should not regard the setting as inappropriate, for the age-long tradition of our profession is one of service to society as a whole.

The great upheaval through which we are now passing has aroused a ferment in the minds of most men and women. In our own profession there is much more thinking—to which no-one objects—and in consequence more planning. Planning is an activity of the human mind regarded by many as a waste of time, and by others as evidence of a sinister intention to destroy the freedom of the individual. But planning, as Harold Laski [3] has said, is a neutral exercise; and, I would suggest, when practised by a free and learned profession, this description is the truth, the whole truth, and nothing but the truth. Most reasonable men will admit that a critical re-examination of our traditional ideas and purposes during the last few years has shown the need for a new orientation in the pattern of medical science and practice. Do we see the future clearly, or do we look through a glass darkly, each one of us perceiving a different picture?

It is clear that some of the greatest achievements in *preventive medicine* will from our special viewpoint be in the nature of epiphenomena, the by-products of an expanding human welfare created by *social* measures related to housing, nutrition, economic security, education, recreation, and so on. If to this be added the abolition or large-scale reduction in the incidence of controllable disease resulting from the purposive application of medical science to specific problems, the field of *curative medicine* is certain to undergo contraction. This change in the scene of action will take a generation or more to come about. But now is the time to begin to foster that change in outlook which the doctor of the near future must acquire. This may be simply stated as the biological and sociological approach to the problems of health and disease.

PRACTITIONER AND SURGEON

The *general practitioner*, as I see him, will have the primary care of the family unit in health and in disease. As of old, in his community, he will continue to be in a far wider sense, a guide, philosopher, and friend. But if he is to merit the title of philosopher he will need to be a learned man. His main preoccupation will be the study of the phenomena of the early deviations from the normal rhythm of mental and physical health at all age-periods, the recording of such observations, and the collation and classification of recorded facts. He will apply to the individual the measures of specific immunotherapy and will treat disease in its earlier and reversible stage. He will I believe work more with his brain and be less of a craftsman, for much of the craft procedures in medicine can and should be carried out by medical auxiliaries acting under his direction. General practice will thus become an important specialism—perhaps the most important of all.

In the field of *specialist practice*, based on a coördinated hospital system, with the aid of biophysics and biochemistry, the physician should regain much of his old predominance over the surgeon. This is not to revive the old prophecy so confidently stated and so completely confounded—Erichsen in the '90's, and Moynihan again in our own time—that the art of surgery has reached its zenith! If we read history correctly, we may be reassured that advances in surgical technique yet to come, combined with still more effective measures to "make the patient safe for surgery," will enable the surgeon of the future to invade almost any region of the body with increasing impunity. There is however one over-riding proviso—that it be necessary for him to do so for the mitigation or cure of a particular disease. What must surely happen is that the newer medicine will supplant the relatively crude surgical procedures used today in the treatment of many disorders of the ductless glands—e.g., thyrotoxicosis—and of the biliary and gastro-intestinal systems. The future looks rather grim for the abdominal surgeon! But this change in the balance of power will have an equally great repercussion on the repertoire of surgical feats of the orthopædic surgeon in the field of chronic rheumatic diseases, poliomyelitis, pyogenic and specific infections of bones and joints. The surgery of accidents will no doubt long endure.

The lesson is clear. The surgeon of the future, if he is not to become a mere craftsman in an ever-diminishing sphere, must not only be grounded in the basic sciences and in medical science, but must keep abreast of expanding knowledge in these disciplines. His approach also, to the problems of disease, must be that of the physician-biologist. In no field is this attitude of mind more essential at the present time than in the wide range of disabilities of the locomotor system. I think we may claim one virtue for the orthopædic surgeon, that with all his imperfections, he has learned to attune his outlook to the social implications of disease, more perhaps than any other practising clinician.

FUTURE SCOPE OF ORTHOPÆDICS

The question we may now ask is whether the sphere of action of the orthopædic surgeon will remain relatively stabilised for some time to come. It may be helpful at this stage to place on record once more that definition of our specialism which we inherited from our great master Robert Jones—"The treatment by manipulation, operation, re-education, and rehabilitation, of the injuries and diseases of the locomotor system." This definition is conceived in terms of therapeutics, and to complete the description of our rôle it must be added that, in the exercise of our diagnostic functions, we are called upon to act both as a court of first instance and as a court of appeal. In the genealogical tree of orthopædics, a dual ancestry may be distinguished. On the one hand, orthopædics is an illustration of the evolution of specialism; on the other, it represents the larger part of the practice of "general surgery" before the advent of the abdominal revolution.

The evolution of specialism in all fields of human knowledge has consisted in the abstraction of parts from the greater whole. Thus, from general surgery, (in its 19th century connotation as the whole of surgery) orthopædics, urology, thoracic surgery, neurosurgery, and plastic surgery have in turn been abstracted. Of these special fields it will be agreed that orthopædics is by far the largest abstraction. It is in scope and importance analogous to neurology as the largest abstraction from general medicine. Now the natural trend is for the process of abstraction to continue, and to be applied in due season to any large and increasingly complex field itself an abstraction at an earlier period. This course of events has been seen in the splitting up of physical and chemical science into various disciplines. But in the realm of science there has also been re-integration, and new combinations have emerged, as for

1. Read before the section of orthopædics of the Royal Society of Medicine, Nov. 2, 1943.
2. Science and the Modern World, London, 1938.
3. Reflections on the Revolution of our Time, London, 1943.

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example in the science of thermodynamics, and today in the field of scientific action, the chemical engineer and the chemical physicist. The pattern of science is always changing, and this must apply to medical science and practice.

In orthopædics at the present time we can detect the tendency to abstract or isolate the treatment of injuries of the locomotor system (surgery of accidents) as a future "sub-specialty" providing a career for a limited group of orthopædic surgeons. This trend, arising within our own ranks and under our own guidance, has received powerful reinforcement from the outside, consequent on the enhanced importance of industrial medicine. We may also contemplate a potential modification in our sphere of activity resulting from the organisation of *arthritis centres* in a national scheme for the study and treatment of the chronic rheumatic disorders. This development, in which there is to be a natural and close collaboration between the physicians and ourselves, may one day create a new specialist field, an abstraction from both medicine and orthopædics, but at the same time a new synthesis in medical and surgical practice.

These two examples suggest that the field of practice of any *single* orthopædic surgeon may tend to contract rather than expand in the future. On the other hand, the collective responsibility of the society or guild of orthopædic surgeons may come to dominate an even wider field than today. We must keep an open mind on these larger questions which appear at first sight to be related only to the apparent contraction or expansion of our own private universe. We have always to remember that whereas orthopædics is in the limited sense an established field of specialist practice, the principles of orthopædics constitute a *notion* which should pervade the whole fabric of medicine and surgery. Such general principles as the application of rest and fixation in the promotion of the repair of injured tissues, in the control of infection, and in the prevention of deformity and contracture, and the use of purposive movements in the restoration of function—these are surely common property. I would suggest therefore that the changes I have touched upon do not point to an invasion and disintegration of our special province, but rather to a wider diffusion of our influence and teaching in medicine as a whole.

ORTHOPÆDICS IN UNDERGRADUATE TEACHING

This is a difficult and somewhat comtroversial subject. The question is bound up with the larger and basic problems of the content of undergraduate education in clinical medicine and surgery as a whole. It would seem that we are in danger of forgetting that the aim of all undergraduate teaching is to turn out a doctor who after a further period of postgraduate training is fit to enter general practice. Lip service is paid to this conception by most teachers—occasionally from ulterior motives—but the direction of clinical teaching in many medical schools has come to bear little relation to this central idea. In the wards of the medical side of the teaching hospitals, the student is still confronted with the late results of disease, with large numbers of clinical rarities, and with syndromes presented as isolated from their environment and labelled as specific diseases. On the surgical side, the atmosphere tends to be dominated by the dramatic circumstances attending feats of major surgery. The stage is set for the prologue, the performance, and the epilogue. The whole setting is unconsciously designed for the training of the future specialist. We have indeed gone astray, and only a radical change of outlook can bring us back to the way of rationalism.

Envisaging the general practitioner of the future as the biologist in action, I have tried to formulate for my own guidance the basic themes of the content of the clinical education and training of the undergraduate. These as I see them are :—

(1) The *meaning* of symptoms and signs in the context of disordered physiology and anatomy.
(2) The natural history of disease—not of specific diseases. In Henry Cohen's words, "There are no diseases, there is only disease." [4]
(3) The response of the patient to the special influences of his heredity and environment—the study of the whole man in the society which he has inherited and which has also inherited him (Levy [5]).

It should be repeatedly impressed upon the student that the clinical syndrome observed in the casualty department, outpatient clinics, and in the wards is an episode, merely one phase in the patient's biography. With this approach, the picture of established and relatively incurable disease, which must for a long time form so much of the clinical material of the teaching hospitals, can be presented to the student in true perspective—as a stage in a biological disorder, and not merely as disease with specific labels providing an examination exercise in differential diagnosis. All teachers will thus in their respective spheres teach social medicine.

Now if this conception of the basic aim and content of clinical teaching be accepted, it is obvious that the orthopædic surgeon who deals with perhaps the widest single field in medicine—the disorders of the locomotor system—has just as much to offer to the student as any other clinician whether bearing the title general or special. I would therefore maintain that the orthopædic surgeon must take a large share in undergraduate clinical teaching throughout the three clinical years. He will not teach as a specialist, or attempt to teach something regarded as a specialism in the narrow sense of the term. He will certainly not teach orthopædic *surgery* to undergraduates, but he will teach *orthopædics*, first as a notion in clinical medicine, and second in its special application to the wide field of disorders of movement and locomotion, with all its biological and sociological background. The same status and responsibility in undergraduate education must clearly be accorded to all heads of the larger clinical departments—the major specialisms within medicine and surgery, and the fully differentiated specialisms such as pædiatrics, ophthalmology, and so on.

At this stage I seem to hear a still small voice posing the question—"Who will teach general medicine and general surgery?" Or the same question in a less naïve form—"Who will teach general principles?" The answer is plain. In the first place there are no men today, under the British hospital system, omniscient and omnicompetent, capable of teaching general medicine or general surgery—i.e., the whole of medicine and the whole of surgery. And secondly, all specialist teachers, if fit to be university teachers at all, are in a position to present general principles in the most illuminating fashion.

There remains the essential problem of the coördination of the collective effort of a group of "specialist" teachers. Every test team of all talents needs a captain, but as I have often said when using this cricketing metaphor, he is not required to be expert as a batsman, bowler, fielder, and wicket-keeper! The titular head of a university department of medicine or surgery must be primarily a specialist of distinction in one field of clinical action. He must also be a scholar of wide learning and culture—in the words of Plato, a synoptic man. I would here stress my own strong personal conviction that the direction and coördination of the larger strategy of undergraduate teaching is not the function of a clinical dean.

TRAINING OF THE ORTHOPÆDIC SURGEON

If we aim at the highest standards for the future, we shall ensure that the orthopædic surgeon will be among the best educated of the corps of consultants and specialists. We are I believe all agreed that the short-cuts to the major specialisms, which have brought discredit to the whole movement, must be suppressed. In this respect we have much to learn from the rigorous standards of education and training now demanded in the USA and which have long been a feature of Continental surgery. In Great Britain we shall undoubtedly see in the near future the setting up of a recognised national standard of education and training for the future specialist. Both the Association of Surgeons of Great Britain and Ireland and the British Orthopædic Association have submitted progressive views on this question to the Royal Colleges.

4. The Nature, Method, and Purpose of Diagnosis, London, 1943.

5. The Universe of Science, London, 1933.

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My own version of the ideal scheme of postgraduate training may be briefly summarised. The period of training for the would-be surgeon falls naturally into two main stages:

(1) A *preliminary stage*, common to all, immediately following qualification and consisting of a combination of varied clinical training in junior resident posts and higher education in the basic sciences. This stage would cover three years and would culminate in the obtaining of the requisite higher diploma of one of the Royal Colleges.

(2) A *second stage*, the period of true apprenticeship, in the capacity of whole-time resident surgical officer, registrar, or chief assistant (the three titles are of equivalent status).

For the intending orthopædic surgeon, one year of this second period should be spent in a "general surgical" unit, where in our present pattern of surgical organisation the experience gained will be mainly in the classical field of visceral surgery, and cancer surgery in general. After that he should spend not less than *three years* as resident surgical officer in a large orthopædic hospital, or whole-time assistant in the orthopædic department of a large general hospital. In university and teaching hospitals a longer apprenticeship is desirable, so that during this period the chief assistant can be seconded for travel for six months, or exchanged with his opposite number in a clinic of equal standing in the Dominions, USA, elsewhere in Great Britain, or in Europe.

The future university teacher should receive special training in experimental and clinical research. At the end of the full period of training, the young orthopædic surgeon should be eligible for registration as a consultant or specialist by a central academic body set up for this purpose.

* * *

And now in conclusion, what kind of men and women do we desire to see as our successors? Surgeons may be divided into three classes, the scholars, the teachers, and the craftsmen. All have their place in the order of things. The ideal, seldom attained, is that all three attributes may be combined in one man. It is the duty and responsibility of those entrusted with the training of the orthopædic surgeon of the future to ensure that we recruit and educate as high a proportion of scholars and teachers as any other of the major specialisms in medicine and surgery. For, in the world of medical science, as in society, we shall be ultimately judged by the quality of our contributions to the advancement of knowledge.

EASIER STRETCHER-BEARING

THE under-carriage, with cross-bar and cycle wheel, illustrated here has been designed by Mr. Donald Duff, FRCS, of Denbigh, to fit under a stretcher. It weighs 9 lb., can be removed in one minute, and saves much of the labour of stretcher-bearing. It should be serviceable in rough hill country as well as on level ground, and can also be used to apply artificial respiration by rocking. The illustration shows its application to a sledge stretcher. When not in active use it stows below the stretcher canvas bed. "The local St. John Ambulance division," writes Mr. Duff, "carry it daily in their ambulance and would welcome comparison test against any other stretcher equipment."

Dr. GEOFFREY MARSHALL, physician to Guy's Hospital and Brompton Hospital, has been appointed honorary consulting physician to the Ministry of Pensions.

Special Articles

EVOLUTION OF AN INFORMATION SERVICE*

THE BUREAU OF HYGIENE AND TROPICAL DISEASES

R. L. SHEPPARD
SECRETARY OF THE BUREAU

THE report of Lord Hankey's Committee on the Imperial Agricultural Bureaux [1] describes the growth of the bureau system for collecting and distributing agricultural information. The medical bureau system, as we now know it, originated in the need for information about the diseases of man and animals in tropical Africa, a need first realised by Joseph Chamberlain and Patrick Manson, his medical adviser, in 1898, and met in 1908 by the founding of the Sleeping Sickness Bureau. By a natural process of expansion and adaptation this became the Bureau of Hygiene and Tropical Diseases, and the pioneer of the chain of similar information bureaux later established to serve in various ways the interests of the British Empire.

It has been said of our colonial policy that improvements usually follow a tragedy instead of being made in time to prevent it. Certainly the founding of the Sleeping Sickness Bureau followed tragic circumstances. In 1901 the Foreign Office received a report of a widespread epidemic of sleeping sickness in Uganda from which some 20,000 natives had already died and many thousands more were dying in one district alone. Scientific commissions were sent out to investigate, and, though some progress was made in determining the cause of the disease and the nature of the fly responsible for its transmission, the disease spread through the Belgian and French Congo, German East Africa and Rhodesia and menaced the Sudan and Nyasaland. Alarmed at a prospect which threatened to exterminate the populations of whole areas of tropical Africa, the European governments concerned convened a conference of administrative and scientific representatives in London in June, 1907, to formulate concerted measures against the disease. One proposal made at this conference was that an international central bureau be established to collect and distribute information about sleeping sickness, but it proved impossible to reach a general agreement for international coöperation, and the conference broke up. The British Colonial Office, unwilling to let this proposal drop, decided to establish in London a national bureau to serve as far as possible the same purposes as those envisaged for the international one. Thus as an emergency measure to deal with a threatened disaster in tropical Africa the Sleeping Sickness Bureau came into being in 1908 under the ægis of the Colonial Office.

The main function of the new bureau was: "to collect from all sources information regarding sleeping sickness; to collate, condense and where necessary translate this information; and to distribute it as widely and quickly as possible among those engaged in combating the disease." The bureau was made responsible for issuing two categories of publications—scientific publications for research workers and medical administrators in the infected districts, and less technical publications for Government officials, missionaries and others working in these districts. The bureau's first scientific publication appeared in October, 1908, as the *Sleeping Sickness Bulletin*, which in its forty numbers published up to September, 1912, summarised the previous and current papers on trypanosomiasis from field and laboratory. An exhaustive bibliography, containing nearly 1900 references to original papers on the disease written before April, 1909, was also prepared.

One task allotted to the Sleeping Sickness Bureau was the preparation of maps of tropical Africa to show the distribution of trypanosomiasis and of the different species of blood-sucking insects suspected of conveying it. Few records were available for making the fly maps, and Dr. Bagshawe's request, as director of the bureau, that the Colonial Office should send special entomological officers to Africa to investigate the fly distribution,

* Based on a paper read to the British Society for International Bibliography on Oct. 26, 1943.

1. HM Stationery Office, 1943.

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helped to bring about the formation of an Entomological Research Committee in 1909, which in its turn led in 1913 to the establishment of the Imperial Bureau of Entomology. In 1918 a proposal took shape to form an Imperial Mycological Bureau, with similar functions, and the value to agricultural research of these two bureaux led to the establishment in 1929 and subsequent years of other Imperial agricultural bureaux. The Sleeping Sickness Bureau may therefore claim to be the prototype on which the bureau system was modelled. In 1911 the Colonial Office extended the bureau's interest to kala azar, and a year later its scope was further enlarged to include all tropical diseases, its name was changed to Tropical Diseases Bureau, and it began publication of the *Tropical Diseases Bulletin*, the only comprehensive review in this field of science.

The emergence of a definite hygiene side to the work of the Tropical Diseases Bureau came in 1914 with the issue of the first of a series of special sanitation numbers in its *Bulletin*. These were published as separate supplements from 1920 to 1925, and in 1926 gave place to the *Bulletin of Hygiene*, which covers the whole field of public health activities, not only in tropical countries but also in the Dominions and at home. Details of medical progress in the colonies are not always easy of access. Valuable records are contained in reports issued by the colonial governments, but these are available in very few libraries and are so numerous that it is a tedious task to bring together the information they contain on any particular subject. The bureau therefore summarises the medical reports of all the colonies in an annual supplement to the *Tropical Diseases Bulletin*.

In 1938, when war seemed imminent, the bureau envisaged the possibility of producing a bulletin on the medical problems of war. When therefore in 1940, at the request of the Director-General of Army Medical Services, the Medical Research Council asked the bureau to edit a *Bulletin of War Medicine*, the preliminary plans were already well advanced, and the first issue was ready in September, 1940. Since then it has kept the medical men of the British and Allied armed forces and of the Emergency Medical Service in touch with advances in medical science in relation to war. Here, as in its other publications, the bureau maintains an international outlook and contrives to overcome the language difficulties; papers in Russian, German, French, Spanish, Portuguese, Italian and Dutch are regularly noticed, as well as those in some of the less known languages such as Japanese, whenever this is possible to arrange. The journals from which abstracts have been prepared are preserved in the library of the London School of Hygiene and Tropical Medicine, where they are classified according to a scheme devised by Mr. C. C. Barnard,[2] the school librarian.

* * *

Apart from its bulletins, the bureau receives and answers many inquiries direct. From its classified records going back over a number of years it supplies a considerable amount of information to the Services and other bodies, in addition to the information on tropical diseases and public health matters which is constantly required. In the immediate postwar period there will be an urgent need to intensify the study of the epidemiology and phenomena of disease and the means of effectively building up and preserving the health of stricken communities. International effort will have to be coördinated and information will need to be collected by central agencies for distribution to all engaged on this work. To quote from Dr. Hugh H. Smith,[3] of the Rockefeller Foundation: "The great Powers emerging victorious from this war must share for a long time the responsibility of those nations whose health organisations have been broken and disorganised." The service of information which the bureau system in this country can offer—ready to hand and founded on long experience—may prove one of the most valuable contributions of the British Commonwealth to the building of a new world.

2. A Classification for Medical Libraries, London, 1936.
3. The rôle of epidemiology in the post-war world. *Advancement of Science*, Jan. 1942, vol. II, no. 5, Science and World Order, 92.

MEDICINE AND THE LAW

Function of a Medical Assessor

A RECENT decision on a workmen's compensation case has thrown light on the duties of medical assessors. The employers had successfully applied to the county court for a review of their weekly payments on the ground that the man's continuing incapacity was due to his unreasonable refusal to undergo a further surgical operation. In the final appeal the House of Lords has ruled that there was no evidence of unreasonable refusal; to this aspect of the case a further reference will be possible when a fuller report of the decision is published. Meanwhile the significant facts are that the county court judge was sitting with a medical assessor, and that, during the final speech of counsel for the employers, it occurred to the judge or to the assessor that a medical examination of the workman might assist the court to determine the issue. Thereupon an examination was made, out of court and in private, and it was clear that the judge, in making up his mind, was influenced by the advice received from the assessor. This, says the Lord Chancellor, was an impropriety. The assessor's view, based on a private examination, should not have been introduced into the case; as the judge avowed that his decision was based on the assessor's advice, the decision could not stand. There was, it seems, no obligation on the workman to submit himself for examination by the assessor, even though the particular assessor was one of the panel of medical referees. It is not clear whether counsel for the workman made any protest at the time.

A medical assessor, says Lord Simon, is like any other assessor. He is an expert available for the judge to consult if the court needs help in appreciating the effect and meaning of technical evidence. An assessor has no right, one may infer, to ask a witness any question himself. He may, in Lord Simon's view, suggest to the judge in a proper case some question which the judge can put to an expert witness in order to test the witness's opinion or to elucidate his meaning. And the judge may consult the assessor as to the proper technical inference to be drawn from proved facts or as to the extent of the difference between seemingly contradictory conclusions reached by experts. But an assessor must not be treated as an unsworn witness in the special confidence of the judge. To treat him as a witness whose testimony cannot be challenged by cross-examination is to misunderstand his true functions. The point is, of course, the more important because it may not be possible for the parties to appreciate the effect of that testimony until judgment has been delivered.

In Britain the legislature has made up its mind that the disputed facts in workmen's compensation shall be formally determined in a court of law instead of being referred, in so far as the issues are a matter of expert medical or surgical opinion, to medical or surgical experts. In other fields of jurisdiction the power to decide facts has been conceded—as, for instance, in the matter of disability pensions—to a "quasi-judicial" or even an entirely non-judicial tribunal. Some reformers have suggested that an issue like the refusal of a workman to undergo an operation might be decided by a panel of surgeons. The House of Lords judgment emphasises the fact that we are not yet approaching any such reform. It was a commonsense proposal by the county court judge that his assessor should examine the workman. The timing of it, however, was wrong. And, whether or no it was a fatal mistake of the court to require the examination at all, the House of Lords could not perhaps have interfered if the county court judge had not made it clear that he was following the opinion reached by the assessor at the private eleventh-hour examination. Many a county court judge, one may assume, is influenced by impressions received privately from a medical assessor—impressions on which counsel would have liked to cross-examine.

Women Suicides

At the trial of Flying-Officer Croft at Winchester assizes for the murder of a WAAF corporal in Cornwall the question was whether the accused shot the girl or whether she committed suicide. It was hardly disputed that the officer, a married man, had become infatuated with the girl, that his letters showed him to be jealous of her, and that, while they were together in a summer-house,

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she received fatal bullet-wounds in the head and left breast inflicted by his service revolver. He contended (though in law it is an imperfect defence) that they had made a "suicide pact," that she had shot herself and that he had then failed to carry out his own part.

A pathologist gave evidence that medical experience favoured the opinion that women who committed suicide rarely used a firearm; if they did use one, they seldom aimed it at their heads. Women, he thought, had an instinctive desire to avoid disfigurement. Men, on the other hand, mostly shot themselves in the head. He was asked by Mr. Justice Humphreys how many cases he had known of a woman committing suicide by shooting herself. The witness had known of none. Whence then, asked the judge, comes this evidence that a woman rarely fires at her head? "From popular knowledge," replied the witness. It would be interesting to know whether statistics throw any light on the question. Female crime has been diminishing for many years and the records of female suicide are not voluminous. The pathologist, who had tested the effect of bullets on the dead girl's skirt, expressed the view that the revolver was at least six inches away from her tunic when the chest wound was inflicted and at least a foot away in respect of the head wound. The defence suggested that the girl might have shot herself in the chest while leaning forward in a sitting position and then caused the head wound by falling forward on the revolver. The jury, after 20 minutes' consultation, found a verdict of guilty.

ECONOMY IN DRUGS

THE Therapeutic Requirements Committee of the Medical Research Council is revising its War Memo No. 3, *Economy in the Use of Drugs in War-time*. Drugs are again to be classified into three groups—(A) those whose use is unrestricted because they are either essential or readily available; (B) those which are essential only for certain purposes and should be used with strict economy; and (C) non-essential drugs whose importation or manufacture for home use is not justified in war-time. The main changes and additions will be as follows.

Group A.—Acetomenaphthone, amylene hydrate, arsphenoxide (mapharside), brilliant green, calcium phosphate, crystal violet, ethisterone, concentrated solution of ethyl nitrite, hexœstrol, lethane, lonchocarpus, methyltestosterone, detoxicated staphylococcal toxin, papaveretum, papaverine and its salts, pentamidine, 'Pentothal sodium,' pethidine hydrochloride, pheniodol, picrotoxin, potassium bicarbonate, bromide, hydroxide, iodide, nitrate and sulphurated potash, propamidine, 'Prostigmin,' sodium metabisulphate and morrhuate, stilbamidine, terpineol, testosterone and testosterone propionate, theophylline sodium acetate, thiouracil, tribromomethylic alcohol and wood alcohols.

Group B.—Acetylsalicylic acid, alcohol, androsterone, bismuth subgallate, codeine, eschatin, eucalyptol, ipomea, kino, krameria, lobelia, lobeline, menthol, mepacrine hydrochloride and methanosulphonate, oils of anise, cade, camphor, cardamoms, caraway, cinnamon, clove, dill, hydnocarpus, lemon, peppermint and turpentine, vitaminised oil, pamaquin, phenylmercuric acetate and nitrate, potassium chlorate, citrate and permanganate, pyrethrum, quinidine sulphate, quinine salts, riboflavin, ricinoleic acid, scammony resin, sodium perborate and tauroglycocholate, strophanthus, succinylsulphathiazole, sulphamezathine, purified talc, thymol, totaquine, urethrane and zinc peroxide.

Group C.—Dienœstrol, ethinylandrostenediol, solution of hamamelis, methylandrostenediol, syrup of iron phosphate with strychnine, and vitamin E.

Strict economy is essential in aspirin and alcohol. Pharmacists now substitute liquid extracts or other equivalent preparations for tinctures ordered on NHI prescriptions unless the prescription is marked "no substitutes," but they still dispense tinctures for private patients; doctors will be contributing to the war effort if they take the trouble to find out the non-alcoholic equivalents of their favourite tinctures, and omit them wherever possible from their prescriptions.

Cinchona, totaquine and quinine salts, mepacrine and pamaquine are now reserved for the treatment of malaria, quinidine is reserved for cardiac arryhthmias, and desoxycorticosterone acetate for Addison's disease. Supplies of sulphasuxidine (succinylsulphathiazole) and sulphamezathine are limited. Vitaminised oil is now scarce, and is no longer suggested as a substitute for cod-liver oil.

In England Now

A Running Commentary by Peripatetic Correspondents

EXAMINING has a high educational value. I do not mean the mere acquisition of experience and an understanding of students' difficulties as reflected in their approach to problems, although this is of no small advantage to one who aspires to teach medicine. I mean a more direct personal education. In fact, whenever I wish for instruction on a particular subject I set it as a question in an examination paper and rarely do I fail to profit. The intensive application demanded by the impending ordeal brings out the gist of current knowledge even if it is frequently presented in a relatively illegible and unreadable form. Moreover we tap the resources of every educational centre in the United Kingdom and even further.

There was a time when in my pride I scoffed at the idea that I could learn from juniors, especially in fundamentals. Now through their instigation I often resort to reference works and find that there is a good deal that I ought to have known or thought that I knew. Recently, we set a question on diverticulitis. One candidate startled me by his opening sentences: "Diverticulum means a house of ill-fame by the wayside. And in the colon when their contents become impacted that is indeed what they are." I had welcomed this as one of the unexpected witticisms that too seldom relieve the gloom of wearisome marking, and had designed it for cold storage and future use. But on its appearance in a second paper, with the variant, "and they live up to their reputation," I consulted appropriate authorities to discover that some such meaning was current in the 17th century. Our candidates are impersonal numbers, otherwise investigation would surely have led to the discovery of a common teacher who had been working off a bit of his classical lore.

I think we ought to combine to discourage the use of certain clichés. Why do we allow our students to describe the sufferer from angina pectoris as experiencing a "sensation of impending dissolution"? I suppose the term is defensible in this connexion but it seems to me singularly inappropriate. Incidentally one candidate's summary of treatment was that "the clothes should be loosened and all the windows opened," which was reminiscent to me of the good old Dickensian lumbering humour in the style of the "flood of tears and a Sedan chair" He observed that the constant danger of sudden death should not be impressed upon the patient and that his life should be so ordered that he was unworried. I was amused to note that "unmarried" had been erased, and I wondered if a little superficial psychoanalysis would have revealed something in this candidate's psychopathology of everyday life.

Then there is the "bell-sound" in pneumothorax. I think I know what this is, so I can only conclude that I am no campanologist. One poetical candidate said it has the sound of church bells across the sea; another, more prosaic, described it as the clanging of pails at the bottom of a deep well. The wise one says "the sound is characteristic," as if to suggest a camaraderie with his examiner, an acceptance of his acquaintance with the sound, or contempt for his ignorance if he does not know.

* * *

I never make a spelling mistake, or, as the Captain of the *Pinafore* compromised, hardly ever. And this accomplishment seems somewhat surprising in one who is conscious of a particularly poor visual memory. It seems as if the element of interest is sufficient to overcome a physiological disadvantage when applied in some highly specialised direction; or is it begging the question to accept fatalistically a constitutional imperfection? It must be lack of interest which explains the generally bad spelling of examinees, who as potential members of a cultured profession are presumably reasonably educated and who certainly read enough to familiarise themselves with the appearance of common technical words. I have been at some pains to consider orthography (or should I say dysgraphy?) as presented by some 130 candidates. They perpetrate pretty freely the commonplace errors—the *ie* and the *ei* words, for instance. *Accomodate, developement, occurence* and *embarrasment* have at least an even-money chance. *Occassionally, difficiency, inoccuous, insiduous* and *preceeded* gain dis-

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honourable mention. But what surprises me is the frequency with which *syphylis* appears: one would have thought that its daily appearance in our newspapers ought to have stamped it with certainty. *Vomitting, apetite, diptheria, inflamation* and *hæmmorage*—the last with several queer variants—are the outstanding technical offenders. *Abscence* is so common that I suspect it arises from recollection of abscess. When I see *thysis* and *clinitian* I can only presume a relation to phonetic spelling though surely nobody teaches this nowadays.

But what with basic English and correspondents to the *Times* advocating the free and easy system of spelling just as you please, I am certainly démodé.

* * *

I suppose that, sooner or later, every doctor is asked why faith-healers and others of that kind can cure cases which by our standards are incurable. If we completely pooh-pooh stories of such successes we are treading on dangerous ground, because, without any irreverence, the dividing line between modern religious miracles and the more prosaic work of Mr. Y up the road is far from well defined. I feel that there are enough well-authenticated instances of true faith-healing to prevent our being dogmatic, but that the wonderful opportunities given to charlatans have tended to bring the whole art into disrepute. To such queries I usually make this answer, which is by no means original. If Dr. X cures his patient it is taken, quite rightly, as a matter of course. If he fails to do so, the patient has no particular reason for concealing his doctor's failure; he may, if of a complaining nature, even give it considerable publicity. If, on the other hand, the patient consults the faith-healer Mr. Y and the latter improves his condition the event is sufficiently noteworthy to be cried from the roof-tops—particularly if orthodox medicine had previously failed. This is perhaps right and proper, credit being given where it is due. Even Mr. Y has his failures, however, but the large numbers who slink away from his door, disillusioned and much the poorer, are unlikely even to admit their foolishness. Thus, with only one side of the story being told, may arise the myth of infallibility.

My brother was travelling in a bus one day. Behind him were two men, conversing in loud tones. One of them had a brother called Tom and it was the fortunes of the latter which were occupying their attention. Tom had been crippled in an industrial accident. His final disability was considerable and he walked with crutches. He had consulted many specialists but one and all had shaken their heads and said that no more could be done for him. They were very sympathetic—but also very definite. Apparently Tom was not one to take this lying down, and when he heard of a faith-healer who enjoyed a considerable local reputation he decided to consult him. This faith-healer could have had little faith in human nature for he demanded a substantial deposit before accepting the case. He then talked for a long while and convinced Tom that his faith was at a very low ebb, and that many visits would be necessary in which to build it up to the required level for a cure. He must have been very convincing because the unfortunate patient struggled to and fro over a long period By working-man's standards these visits were expensive but, as Tom had accepted a lump sum in compensation for his injury, he had "a bit of brass in hand" and was prepared to carry on—as of course was the faith-healer. At last the day came for the test of faith, and, in the words of the narrator, "Aud Tom went in and faith-healer chap says 'Well Tom—has tha faith lad?' and Tom he says 'Ay—a has faith.' So faith-healer stands Tom, crutches an 'all, in t'middle of room and moves to side. 'Now Tom,' he says, speaking very solemn, 'will thy faith support thee?' and Tom, a bit doubtful like, says 'Ay—a reckon so.' 'Well then,' says faith-healer, 'throw away thy right crutch' and Tom throws it away. 'Now thy left crutch,' and away that goes too—and Tom he sways something horrible. Faith-healer he holds out his hands and beckons. 'Come Tom,' he cries, 'have faith and walk to me.'" At this climactic moment the companion of the speaker, all agog, interjected "An' did e?" "Nay," said the storyteller, "he fell on his ———." From this story my brother gained instruction which I am glad to hand on.

Letters to the Editor

THE COLLEGES AND CONSULTANTS

SIR,—In March, 1943, at the invitation of the Minister of Health, the Royal Colleges combined with the British Medical Association and other bodies to form a Representative Committee in order to discuss with the Minister the formation of a comprehensive medical service. Apart from the common duty of planning this service for the country, the colleges have a particular responsibility in regard to the consultant and specialist services, and we think it right to explain what we have done to discharge that responsibility.

In the first place when the standing joint committee of the three Royal Colleges requires information and advice in matters concerning the special branches of medicine and surgery, it refers to the official bodies representing those branches.

The college members of the Representative Committee are briefed and advised by an existing committee of the colleges. This committee consists of: (1) 13 representatives of the Royal Colleges; (2) 2 representatives nominated by the teaching hospitals of each university in England, Wales and Northern Ireland; (3) 11 representatives from the non-teaching hospitals; and (4) 1 representative from each of the specialities. This committee, apart from its representative character, provides machinery for referring questions to its constituent bodies—an essential provision, in our judgment, of any committee which sets out to give advice on such important matters as terms and conditions of service.

By these means the colleges hope to keep in touch with the views of consultants and specialists throughout the country, so that they may give effect to them in any action they may take.

The colleges have also taken steps to ascertain what consultants and specialists are available at the present time. It is clear that the Minister of Health must know how many consultants there are and where they are available, and he is having a survey made under the direct auspices of the Royal Colleges, who are acting in this matter in coöperation with the universities and representatives of the British Medical Association. The result of this survey will not be published; it is for the personal guidance of the Minister.

Previously, the colleges had laid down certain standards which they thought should be required of any practitioner who wished to become a consultant in the future. These criteria are not meant to be retrospective. They will only affect those taking up consultant work in time to come. The only criterion required now is that a man is accepted as a consultant by the practitioners in his neighbourhood. Each district is therefore being asked to supply the necessary information.

In our view, the services of every consultant who is now recognised as such by the profession in his neighbourhood will be needed in any consultant service that may be set up after the war. We think it probable that provision may be made which will enable practitioners who hitherto have not been exclusively engaged in consulting practice to devote themselves solely to consulting work.

MORAN,
President of the Royal College of Physicians.
ALFRED WEBB-JOHNSON
President of the Royal College of Surgeons.
EARDLEY HOLLAND,
President of the Royal College of Obstetricians and Gynæcologists.

London.

MENTAL HEALTH SERVICE

SIR,—We viewed with grave misgiving the proposals for a mental health service submitted by the council of the Royal Medico-Psychological Association to the quarterly meeting on Nov. 24 (*Lancet*, Dec. 11, p. 745). These proposals have now been referred to a broad committee representative of psychiatrists of every kind. In our view the service for mental health must be considered in conjunction with any scheme which may be proposed for the health service in general, and no detailed plans should be made separately from such a scheme. We submit the following comments.

General.—The proposals would aggravate the present separation of general and psychiatric medicine by creating

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a dual service, the mental side having separate administration at all levels from local to national. Whilst we agree that medical training in psychiatry is at present inadequate, the proposals would mean the lengthening of the medical curriculum at a time when all are agreed that it should be simplified. The aim should not be to make all doctors "specialists" in psychiatry, but to ensure that all doctors can confidently diagnose a case as psychiatric or non-psychiatric, and realise their own limitations in the field of mental treatment.

Psychosis and psychoneurosis.—The history of the past 50 years proves that psychiatry cannot develop fully in isolation from general medicine. Although the mental hospital will always contain the majority of beds, most of these will be devoted to long-term cases and persons with gross behaviour disorder. Apart from small admission blocks (constituting no more than 5% of beds) this is the only purpose for which most existing buildings are suitable. For acute treatment the psychiatric clinic of the general hospital must be the main unit and should be the headquarters of the psychiatric service. This does not imply that the staff of the mental hospital must remain permanently at the mental hospital and deal only with chronic cases.

Mere tampering with the Lunacy Act and the Mental Treatment Act and euphemistic changing of names cannot lift psychiatry out of the rut into which the 1890 act has driven it. A new act should be framed separating the legal and clinical aspects, the latter being made part of the general health service. The former should be the sole function of a new "Board of Control," who should be responsible for detention of patients unwilling to receive treatment voluntarily. The clinical psychiatrist should be relieved of all details of this work.

Mental deficiency and child guidance.—These must be branches both of the psychiatric service and of any service for child health. So far as the treatment of mental deficiency is concerned, this is educational and should be the responsibility of the education authorities under guidance of psychiatrists. On reaching school leaving age, the children would be either placed in suitable employment or dealt with at mental deficiency institutions for adults only. Child guidance clinics, being mainly psychotherapeutic, would most efficiently be established at the general hospital psychiatric clinic.

HUGH T. KIRKLAND.
F. A. BLEADEN.

Birmingham.

BOUNTEOUS NATURE AND OVER-NUTRITION

SIR,—It is well known that the reserve power of the various organs in ordinary healthy young adults is very great. Destruction or excision of one kidney does not bring on uræmia provided that the remaining kidney functions well. Animal experiments and results of operations in human beings show that a great portion of the liver or the pancreas can be removed without producing signs of insufficiency of the organ in question. Recovery may take place after destruction of a large area of the skin from burns in human beings. Men with very small testes or with only one testis can procreate and show no signs of eunuchoidism. Healthy young adults seldom call upon all the reserve power of their hearts, and I would say that most persons practically never fully develop and enjoy the reserve power of which their brains—"the organs of their minds"—are capable. We need hardly mention the obvious reserve power of our normal endocrine organs—e.g., the thyroid gland and the pancreatic islets.

In ordinary life all the reserve power of the above-mentioned organs is seldom or never called upon, but with the digestive and associated metabolic functions of the body the same cannot be said. Though the results of total colectomies and subtotal gastrectomies and resections of parts of the small intestine show that the reserve power of the alimentary apparatus of the body must be enormous, yet in prosperous times when bountiful nature under human supervision offers abundance of food, in quantity and variety these functions are not rarely strained to the uttermost. Many persons from childhood onwards live the life of "digestive athletes"—sometimes in addition drinking the maximum amount of alcohol that they can "stand" (but with this latter point I am not concerned at present). The muscular system—owing to relatively sedentary occupations, &c.—usually fails to keep pace in helping to use up this unnecessary intake of food. Over-abundance of "fuel" causes incomplete combustion as well as total excess of waste products, tending in the long run to overwork and permanently damage the metabolic and excretory organs concerned. Who can doubt that such considerations do not often, at least in part, explain the gradual development in middle life of obesity, diabetes mellitus, high blood-pressure and chronic gouty, arteriosclerotic and nephritic troubles, especially when there is already an inborn (possibly familial) predisposition?

No wonder then that war-time conditions—by limiting the intake of food and by increasing (in various ways) the output of energy, thus necessitating more perfect metabolism—improve the health of many persons. During the last war at a hostel for foreign soldiers on leave I saw a notice somewhat like: "Mangez bien, mais ne gaspillez pas." A similar notice might be more appropriately posted up in peace-time in many houses of all civilised countries. Somewhat altered popular habits with regard to excess in eating (as well as in alcoholic drinks) have already probably contributed towards the modern increased average life expectancy for adults.

I do not, however, wish to overestimate the bad effects of what I call *over nutrition*, which in reality is rather a kind of *wrong nutrition*. Brain workers, even when they take next to no muscular exercise, must of course not be "starved." They often feel the need for stimulating food. A lady told me that her husband required a great deal of meat, because he was a brain worker! Frequent and very small meals do really help to stimulate sedentary writers and brain workers, certainly more so than the customary regular full meals. I believe that the craving for food often felt when a continued effort has to be made in writing a long article or book (especially by those who are not authors by profession) is natural enough, but should of course not be satisfied by large amounts of butchers' meat. A well-known medical author on a subject connected with diet once told me that, when finishing a book or article, he had himself derived great help by temporarily leaving his ordinary work in London and living in a quiet place on a diet with cheese as an important constituent.

It seems that overeating by some brain workers is due to a call by the tired brain for food and stimulation, but doubtless the satisfying of this call by large (and meaty) meals is a great mistake and may be finally disastrous if long continued. For temporary reading and writing at night stimulation by coffee or tea used to be most frequently resorted to, but I think that plain milk chocolate (always easily obtainable in peace-time) is generally more useful (at least to "small eaters") and less likely to disturb subsequent sleep. Some day perhaps a vitamin or special substance will be discovered for brain work, which will get rid of the peculiar craving for food, which in some cases becomes tiresome. It seems that the temporarily overworked brain demands a much larger quantity of food than what at the time is required by the rest of the body in the hope (if I may so express my meaning) that it may extract from this quantity a minute but sufficient amount of some precious substance which will act towards it like a vitamin and stimulant.

Harley Street, W.1. F. PARKES WEBER.

PRIMARY PULMONARY TUBERCULOSIS

SIR,—In his article of Dec. 25 Dr. Murray makes several statements which I should not be prepared to accept. I would challenge especially his sentence—"Six to eight weeks' rest is likely to give sufficient time for the lesions to become encapsulated"—if by this he implies that no further rest is necessary in all cases. This would be a dangerous doctrine for many children under 5, although the time given is probably safe for a number of cases over that age. To quote from Sweany's *Age Morphology of Primary Tubercles* (Springfield 1941)—"It may be stated that any lesion that is large in size and not well calcified is potentially dangerous"—and calcification takes a much longer time to occur than encapsulation.

I write from a hospital through which pass yearly some 300–400 children with primary tuberculosis. Among these occur quite frequent complications—lobar atelectases, pleural effusions; and less frequent—chronic miliary disease, bronchogenic spread, localised hæmic

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spread, phlyctenular ulceration, true epituberculosis. I believe that these, which do not necessarily occur within 2 months of infection, and also tuberculous meningitis (rather rare with us), would be much more common did we not pursue the policy of maintaining bed rest till the mediastinal glands were much smaller or showed signs of calcification. (This, almost invariably, means more than "six to eight weeks' rest.") Even then, admittedly, there is still danger of complications due to lingering infection and caseation in the glands.

High Wood Hospital for Children, Brentwood. J. V. HURFORD.

FAT DEFICIENCY AND SCURFY SKIN

SIR,—Recently there has been some discussion as to whether a sufficiency of the essential unsaturated acids is supplied in our diet under present conditions.

When young rats are given, directly after weaning, a diet from which fat has been removed as completely as possible, they develop dry scaly skins, the effect being especially marked on the ankles and tails. Somewhat later, retardation of growth follows. These are the most characteristic symptoms of fat deficiency, though changes in the kidney and irregular ovulation have also been noted. Burr and Burr (*J. biol. Chem.* 1929, **82**, 345; 1930, **86**, 587) showed that the condition could be cured by the addition of fats, and that the curative potency of any fat depended on its content of linoleic and linolenic acids.

Hansen and his co-workers found in eczematous human subjects abnormally low iodine values for the serum fatty acids, and Finnerud, Kister and Wiese (*Arch. Derm. Syph.* 1941, **44**, 849) record that the skins of hospital patients in whom low iodine values of the serum fatty acids were observed showed distinct improvement when lard was added to the diet. There is also other evidence that some people with dry scurfy skins do respond to additional fat in the diet. Under war-time conditions many people are receiving a much diminished supply of fat and therefore of the essential unsaturated acids, and this might have been a factor in producing the dry scurfy skins that are occasionally met with. It was suggested that the substitution of margarine for butter might contribute to this deficiency, since the partial hardening of the fats used in the manufacture of margarine would diminish their linoleic content. Although this explanation appeared unlikely, an experiment was carried out in which a sample of butter provided by the National Institute for Research in Dairying was tested against a sample of margarine provided by Messrs. Lever Bros.

Immediately after weaning, 16 rats were divided into 4 groups, each group containing one female and three male rats, litter mates being in all cases compared. For 26 days they all received the fat-free diet and then the rats of each group received 0·1 g. fat for a further period of 115 days. The rats of group A were given Allan Blackia fat, which contains the lowest content of linoleic acid known in a natural fat and was kindly supplied by Professor Hilditch; those of group B received butter, of group M margarine and of group L linseed oil. The results were as follows:

TOTAL WEIGHT OF RATS IN EACH GROUP

Group	Weight (g.)			
	on weaning	after 26 days on fat-free diet	after 115 days on fat-free diet plus 0·1 g. fat daily	increase in 115 days
A	124	227	605	378
B	148	261	721	460
L	145	252	824	572
M	144	271	765	494

A superior weight of the rats receiving linseed oil over the butter-fed rats was established in 5 weeks and over the margarine-fed rats in 6 weeks from the date on which the first doses of fats were given.

Symptoms of scaly skin began to show themselves at the end of the second week of the fat-free diet. At the end of the experiment the skin of the rats receiving the linseed oil appeared quite normal. The ankles of the butter-fed rats were rather more scaly than those of the rats fed with margarine and the tails of the butter-fed were also rather more annulated. In both these groups the scaly ankles and tails were very pronounced, though less so than in those given the Allan Blackia fat. Euler, Euler and Säberg have also found that margarine promotes better growth than butter fat (*Arch. Chem. Min. Geol.* 1942, **15**B, no. 8).

The small differences between the groups M and B cannot be regarded as significant in view of the number of animals used but the differences between those fed on butter or margarine and those fed on linseed oil can certainly be regarded as conclusive.

The substitution of margarine for butter in the diet cannot therefore be regarded as a factor in producing a dry scurfy skin condition. It is however possible that the decrease of the total amount of fat in the diet may, in cases of especial susceptibility, exert an unfavourable effect on the skin.

Lister Institute, S.W.1. IDA SMEDLEY-MACLEAN.

MINIATURE RADIOGRAPHY

SIR,—Dr. Bridge after reading my letter of Dec. 11 expresses apprehension at some of my observations about the professional secrecy of the factory medical officer. Perhaps his own letter has supplied the answer when he states "it would only be permissible for a factory medical officer to convey information to any member of the management if he had first obtained the permission of the individual concerned." I find nothing in my letter to suggest the contrary and in fact I did preface my remarks (as Dr. Bridge himself quotes) by the statement that the factory medical officer "is under the same responsibility regarding medical secrecy as any other doctor." If therefore the factory medical officer conforms to this obligation, then surely he is obliged to first obtain the permission of the individual before communicating with the management. I have certainly not misunderstood the factory medical officer. Let us avoid side issues and return the attention of readers to the live problems raised in my letter.

London, W.1. NORMAN P. HENDERSON.

COMMON SENSE IN ANÆSTHETICS

SIR,—Dr. Mallinson, in his paper of Dec. 4, suggested that 'Pentothal' anæsthesia had advantages over ether anæsthesia, but I am sure there must have been some mistake in the administration of ether with the Oxford vaporiser. We are told that the shortest time to recover consciousness was fifteen minutes, for example, yet the whole design of the Oxford vaporiser is to give very light ether anæsthesia. I frequently have patients talking in the passage immediately after leaving the theatre. I am utterly unable to understand the average time in regaining consciousness being over two hours. In a recent series of five hundred cases with the vaporiser I have never seen such a case. This delay in recovery may explain the chest complications. I have been very free from such troubles. It is quite evident that the use of the Oxford vaporiser has not been understood.

Now as to pentothal; this is really serious. Dr. Mallinson describes a successful series of patients operated on under pentothal anæsthesia. He achieved what he set out to do, but, with great respect, I would submit that his success was not due to his choice of an anæsthetic agent but to his own skill. Finsterer with local anæsthesia and Sebrecht with spinals achieved results equalled by few, excelled by none, but their results were not due to the anæsthetic agent used. It required respectively a Finsterer and a Sebrecht to excel. It is this ability to achieve outstanding results which denotes a great master, and these results are seldom emulated by ordinary people. There is very real danger that newly qualified practitioners, who have had the great benefit of watching the work of men of outstanding ability, may be deceived by the apparent ease and dexterity with which difficult techniques are demonstrated. Having recently suffered the harrowing experience of losing a favourite patient from primary cardiac failure, under pentothal anæsthesia, I was constrained to make inquiries of my neighbours and I found that my experience was not altogether exceptional, but that there had been a number of deaths in my own neighbourhood.

Deaths and misadventures under intravenous anæsthesia are becoming increasingly frequent. Sometimes I think death is preferable to misadventure. It must be

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a terrible thing to have to explain to the parents of a child (who has developed thrombosis following an injection) why his arm must be amputated. Intravenous anæsthesia is an extremely valuable method for special cases, but I do not believe that there is any way in which it can be made reasonably safe for general use. I do believe, judging from what I have personally observed, that intravenous anæsthesia is far more dangerous than chloroform anæsthesia, in the present state of our knowledge, and unless this technique is to fall into universal disrepute it should be reserved rigidly for the full-time professional anæsthetist. Figures for 1941, kindly supplied by the Registrar-General, support this contention.

DEATHS UNDER OR ASSOCIATED WITH ANÆSTHESIA, 1941

	Males	*Females*
Chloroform *	21	21
Ether (alone)	100	69
Ether and nitrous oxide only	89	68
Chloroform and ether *	36	24
ACE mixture *	2	1
Ether and ethyl chloride *	51	38
Other mixtures containing chloroform or ether †	19	15
Ethyl chloride *	9	5
Nitrous oxide (alone)	36	44
Barbiturates with nitrous oxide	4	5
Barbiturates (alone or with cocaine or opium derivatives)	39	22
Cocaine and its preparations and substitutes (without any of above)	46	38
Miscellaneous (including combinations not specified above) ‡	8	5
Anæsthetic not stated	5	15
	465	370

* Including combinations with nitrous oxide but without other drug.
† Including combinations with barbiturates, opium or cocaine derivatives; and includes 5 males and 8 females for whom combinations with barbiturates were used.
‡ Includes one death (male) under 'Omnopon' and scopolamine alone.

There will be those who will not agree and who will point to a successful series of x or y thousand cases, but did not the chloroformists of thirty years ago produce long series of successful cases? Yet it is now admitted that chloroform is too dangerous for general use. A. M. Betcher, in a survey of the usefulness of pentothal in the US Army, concludes: "The administration of pentothal sodium is safe in experienced hands only, and ether is the preferred anæsthetic for administration by men of the training corps" (*War Med.* 1943, 4, 425).

Flagg, in his excellent book, *Art of Anæsthesia*, warns us "that the volume of a single man's experience is too small to form a true statistical estimate for use by others" and we should heed this warning. No anæsthetic body of any kind in any country, since the Hyderabad Commission of 1891, has set out to discover the real risks attached to each anæsthetic agent, and with the record of many deaths before us this is something of a reproach. It is very urgent that the Association of Anæsthetists should undertake a comprehensive investigation as to the relative safety of all drugs used in anæsthesia. This should be done on a really large scale and it is vital that the practitioner of average ability should take part.

It is useless to devise a technique that can only be successfully used by the full-time professional anæsthetists, when the vast majority of anæsthetics are still administered by general practitioners.

New Barnet. JOHN ELAM.

PRESERVATIVE IN INSULIN

SIR,—Insulin manufacturers state that they can now no longer supply patients with insulin containing no preservative because all British manufacturers of insulin have agreed to discontinue altogether the manufacture and issue of insulin solution without preservative. This decision raises two important points: one medical, and the other turning on the right of manufacturers to alter the nature of essential medical products, in the manufacture of which they hold a monopoly, without permission from the Government. It is only due to the Government's action that they are able to obtain their raw materials.

The medical aspects of the addition of preservatives to insulin were long ago discussed in your columns (*Lancet*, 1931, i, 996, 1053 and 1421) by clinicians of considerable distinction. All agreed in condemning, or being dubious of, the wisdom of diabetics being forced to inject themselves—once or twice daily for many years—with cresols or other toxic preservatives, however small the amounts. The British Pharmacopœia of 1932, however, made it compulsory for insulin BP to contain preservative in spite of insulin itself being a preservative. The committee were apparently rushed into this over-cautious decision because there had recently been bacterial contamination of antitoxic sera. The next Addendum (1936) carefully repealed the instruction to add preservative, though still *permitting* it. Presumably the instruction was withdrawn because many of the large London hospitals had given up insulin BP (*Lancet*, 1932, ii, 969) and were using the foreign preservative-free insulin in general use on the Continent, without any bad effects from bacterial contamination.

It may be argued that no ill effects have followed the use of insulin containing cresol, though this ignores the experience of your correspondents in 1931 and M. M. O. Barrie's results with animals (*Quart. J. Pharm.* 1936, 9, 485). Unfortunately many patients who have had insulin for years do suffer from minor ills such as fatigue, paræsthesiæ, vascular changes, enlarged livers, &c. which, while they are most probably diabetic in origin, may well be accentuated or even caused by regular poisoning with small amounts of cresol. All minor ills of diabetics are too easily dismissed as diabetic.

It seems that time has produced no arguments in favour of adding cresol to insulin while there are, probably, arguments against it. Even in war manufacturers can hardly claim that adding preservative makes manufacture easier. The addition is not part of the sterilising process but is only intended to prevent patients from contaminating their insulin—which, in fact, they do not do, judging by prewar experience here and abroad and the tacit implication of the 1936 BP Addendum. I feel a vigorous protest should be made against this arbitrary decision of the manufacturers of British insulin, both on medical grounds and because manufacturers have no right to control the treatment of patients.

Wimpole Street, W.1. FRANKLIN BICKNELL.

THE NURSE IN CHARGE

SIR,—Considerable experience has shown me that tiredness and irritability are often evidence of commencing tuberculosis long before such symptoms as cough or sputum or hæmoptysis. Yet how many nurses dare to go to the home sister saying they are just tired and irritable? If they dare, the result is very unlikely to lead to the X-ray room, where an early abnormality might be detected long before gross physical signs are present.

Sometimes a nurse will go to a private or panel doctor on her day off, but is afraid to reveal the fact in the hospital, and in any case is unlikely to get a full investigation. Such early cases often do not look ill and may not have a rise of temperature.

If a nurse reports that she thinks her temperature is raised, the sister-in-charge jabs a thermometer in the mouth at 9 AM and if it registers 98·4° or less firmly assures the nurse that she is becoming neurotic. If the temperature were taken later in the day, it might be found to show a significant rise, especially if it is as high as 98·4° in the morning. Yet how often is it checked again? Many tuberculous patients with a persistently subnormal morning temperature have a regular evening rise to 99·2° or 100° which may last only for a few hours but may be of the utmost importance.

Yet one can understand how, under the existing hierarchy, the administrative nursing staff would feel angry at seeing a small queue of "tired" nurses waiting to see the medical officer on their own account. Who is to act as the chaperone, the necessity for which distinguishes the institutional medical officer from the less conventional general practitioner? The latter often has to risk his reputation by doing without, but gains considerably in establishing a confidence that is helpful to both doctor and patient.

The position in hospital is admittedly difficult, but might be less dangerous to the junior nurse if sisters in charge could be persuaded to leave it to the medical officer to make a diagnosis of "laziness" or "nerves" after an examination of the patient. This procedure

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works well in the Services and could be applied to civil hospital routine. It probably is the practice in some hospitals, but should be just as much a privilege of all nurses as is the Rushcliffe scale of salary.

Pinewood Sanatorium, Berks. WILLIAM C. FOWLER.

POSTGRADUATE DEGREES

SIR,—We must all agree with A Service Medical Officer in your issue of Jan. 1 that many young men who have been taken into the Services have been denied the opportunity to take postgraduate courses and higher qualifications. But why, pray, is it "unjust" for "young people" to take their MRCP within six months of qualifying? Surely all honour to them if, under the shadow of the call-up, they can work hard enough to take an advanced examination at this early stage in their career. I have heard recently of several practitioners in the Services who were qualified five or six years before the present war started, but who are now saying that they would have taken higher qualifications but for the war. Having obtained my qualifications in half this time I hope that "after the war" reconstruction committees will treat such assertions with scepticism.

I would like to point out also that both civil and military authorities have had to adopt a system of trainees in order to fill their requirements of junior specialists. Moreover when I obtained the MRCP, of 12 successful candidates 2 were women, and 5 were in the Services.

While I sympathise with those practitioners in the Services who have experienced genuine hardship, I hope the mere fact of having served will never qualify a man for a postgraduate course for which he is ill fitted.

SAM WELLER.

THE NURSE'S PAY

SIR,—Miss Armstrong in your issue of Dec. 18 last reviews the salaries recommended in the second report of the Rushcliffe Committee, and compares the salaries of male nurses with those of female nurses. Her facts are correct as far as they go, but there are other points which she neglects to mention:

(*a*) No male nurse was a member of, or gave his opinion directly to, the Rushcliffe Committee.

(*b*) Most female nurses are resident and receive emoluments valued variously between £100 and £200 p.a. *tax free*, a saving of between £30 and £60 a year at least.

(*c*) The hopeless prospects before male nurses are reflected in the fact that the Rushcliffe Committee did not recommend salary scales for ranks higher than that of superintendent nurse—since no such ranks existed.

STEPHEN HODKINSON,
SRN, DN Lond, Nurse Teachers Certificate.

Infectious Disease in England and Wales

WEEK ENDED JAN. 1

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 2029; whooping-cough, 1509; diphtheria, 578; paratyphoid, 5; typhoid, 7; measles (excluding rubella), 546; pneumonia (primary or influenzal), 1997 (last week 2140); puerperal pyrexia, 150; cerebrospinal fever, 73; poliomyelitis, 6; polio-encephalitis, 0; encephalitis lethargica, 3; dysentery, 89; ophthalmia neonatorum, 60. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Dec. 29 was 1818. During the previous week the following cases were admitted: scarlet fever, 116; diphtheria, 36; measles, 23; whooping-cough, 61.

Deaths.—In 126 great towns there were no deaths from enteric fever, 1 (0) from scarlet fever, 1 (0) from measles, 14 (4) from whooping-cough, 10 (2) from diphtheria, 53 (7) from diarrhœa and enteritis under

Continued at foot of next column

Obituary

MARTHA KIRKLAND GREGORY

MB NZ, DO OXFD

Dr. Betty Gregory, who died on Christmas day at Oxford, qualified at Otago in 1932. After holding house-appointments in New Zealand she went to work in India, first under the Scots Mission at the Women's Hospital, Ajmere, an institution with a high surgical reputation throughout Rajputana, and later at the Lady Hardinge Medical College for Women, Delhi, where she was anæsthetist and lecturer on pharmacology, and endeared herself to Indian women, both students and patients, by her competent work and cheerful personality. Dr. Grigor (as she then was) gave up her post on marriage but returned to medicine when her husband went on active service. She now concentrated on ophthalmology, taking the Oxford diploma and working under Miss Ida Mann at the Oxford Eye Hospital. As ophthalmologist to the Oxford Nutrition Survey her interest was aroused in the ocular signs of dietary deficiency, and at the last session of the Oxford Ophthalmological Congress she reported her observations on the ocular criteria of deficiency of riboflavin. She died from a cerebral hæmorrhage shortly after her husband's return to England, just as she was looking forward to setting up a home.

JOHN BOURCHIER CLAMPETT MURDOCH

MA, MB CAMB; CAPTAIN RAMC

Captain J. B. C. Murdoch who, died on active service in Uganda during December, was the elder son of Dr. John Murdoch of Croydon. He was born in 1908 and was educated at Epsom College, Queen's College, Cambridge, and Guy's Hospital. He qualified in 1933 and took his Cambridge degree three years later. After holding a house-appointment at Guy's in 1935 he settled in practice in Addiscombe in partnership with Dr. Alex. Rose and Dr. J. L. Menzies. Murdoch joined the RAMC in 1941 and spent his first year as medical officer to a battalion of the Grenadier Guards. He leaves a widow, Miss Joyce Allen of Tunbridge Wells, whom he married in 1939.

GARDINER WILLIAM TROUTON

M D DUBL, TD

Dr. Trouton lived for half a century in the Sussex village of Rotherfield, where he practised until ten years ago. Educated at Trinity College, Dublin, he took an arts degree in 1880 and qualified in 1885. When war came in 1914 he was no longer a young man, but for many years he had been surgeon to the West Kent (Queen's Own) Yeomanry, and he served in Egypt and Gallipoli. He was greatly interested in the welfare of old soldiers, and as founder of the Rotherfield branch of the British Legion remained its chairman till his death. In his practice he made happy use of an unlimited store of anecdotes and he was loved by the whole village. He died on Dec. 16 at the age of 85, leaving a widow and a family of five. His son is now a major in the Indian Army and one of his daughters is a medical practitioner in London.

Continued from previous column

two years, and 464 (53) from influenza. The figures in parentheses are those for London itself.

Deaths from influenza have again dropped (690 last week). There were 22 fatal cases at Liverpool, 19 at Sheffield, 16 at Birmingham, and 15 at Manchester. No other great town reported more than 9.

The number of stillbirths notified during the week was 181 (corresponding to a rate of 30 per thousand total births), including 16 in London.

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Notes and News

MEDICAL EXPERIENCE IN MUNICIPAL HOSPITALS

CROWDING of our medical schools hampers students in their training, and the restricted numbers of house-posts available may force some of the newly qualified to launch into practice without sufficient experience as a resident. In a report to the Middlesex County Council, Dr. H. M. C. Macaulay, the county MOH, suggests that the council has an obligation to the community to see that its resources are made available for the training of doctors. A hospital, he says cannot develop its efficiency fully unless teaching is going on in its wards and departments. Inquiring students ensure that physicians and surgeons are kept at the growing-point of their subjects, and a hospital with a school attached attracts the best men and women in medicine. So far there has been little organised teaching in the MCC medical service, though in one hospital coaching classes for the FRCS have been arranged. It would be possible, he thinks, to establish in the council's hospitals postgraduate courses for Dominion and foreign graduates who wish to take higher qualifications, and refresher courses for general practitioners. Moreover, the service could offer some 60–70 house appointments to newly qualified men. It might also provide appointments for young doctors returning from the Forces after the war. These men, Dr. Macaulay points out, though no longer students, may sometimes be medically somewhat immature. Many will be nearing thirty and some will be married; they will not be able to afford to take junior posts at the nominal rates paid to the newly qualified. He suggests that they might profit by the medical experience to be gained in such posts if subsidised so that they could meet their responsibilities.

THE PHARMACIST AS HEALTH MISSIONARY

THE Pharmaceutical Society has pointed out that pharmacists are well placed to second the efforts of the health departments in educating the public to a higher standard of health. In coöperation with the society, the Ministry of Health has now begun to issue, once a quarter, to all the 15,000 pharmacists in the country a bulletin explaining the why and the wherefore of official health policy and official campaigns. "We hope thus," writes Sir Wilson Jameson, the chief medical officer, "to improve the pharmacist's equipment for missionary work in the cause of better health." The first number of the bulletin, which is published as a four-page supplement to the *Pharmaceutical Journal*, contains articles on venereal diseases and droplet infections, together with shorter notes.

HELP WHEN NEEDED

THE third year of the Medical War Relief Fund has brought the total amount subscribed beyond its first objective of £50,000, and left it with a balance of nearly £36,000 in hand. New applications were few, for the lull in heavy aerial bombardment on the home front has continued; but as fighting in Europe spreads appeals will probably increase and later demobilised medical officers will need help in re-establishing themselves in civil life.

Between Sept. 1, 1942, and Aug. 31, 1943, over £3147 was awarded to 19 new applicants and £475 to 7 former beneficiaries. Almost all the new applicants were medical officers in the Services or dependants of medical officers killed in action or taken prisoner, and the following show something of the work that is being done:

Mrs. A, wife of an officer in the RAMC with a large family of children aid a much reduced income received a gift of £500; Mrs. B, a widow whose only son, an officer in the RAMC, had been posted as missing, and who had a daughter, aged 16, still at school was given an alowance of £100 per annum for three years; Mrs. C, widow of a medical officer killed on active service whose daughter, a talented university student, was unable, after the father's death, to continue her education was awarded a grant of £40 a year for three years; Mrs. D, wife of a medical prisoner of war whose practice had suffered during his absence with the result that there was difficulty in meeting her son's educational expenses received a cheque for £200, with the promise of a further £100 in six months; Dr. E, was awarded £100 as temporary help after relinquishing his commission in one of the Services on medical grounds; and Dr. F, a married man with two children at school, who was in difficulty owing to loss of income on joining the RAMC was given £250.

The committee gratefully acknowledges continued coöperation of the Royal Medical Benevolent Fund.

When the need of medical prisoners of war for books became known, the British Medical Association provided a sum of money to buy books for the camps where some of its members were known to be prisoners. But it was thought that individual members of the profession at home would like to help and, to avoid setting up a second medical war charity, this work has been made a subsidiary activity of the Medical War Relief Fund. Money subscribed for the general purposes of the fund will not be used to buy books, but the committee appeals to subscribers for small additional contributions, earmarked for this work. Cheques should be sent to the honorary treasurer of the fund at BMA House, Tavistock Square, London, W.C.1.

CONSERVATION OF STOCKS OF AGAR

AGAR and certain similar substances are now under statutory control, and no person may acquire them except under licence. The aim of the order is to conserve stocks for preparation of bacteriological media. Their use for other purposes, except under a licence or direction from the Minister of Supply, is also prohibited. All persons holding stocks greater than 4-lb. must immediately furnish a return to the Director of Medical Supplies at the Ministry, Portland House, London, S.W.1. Copies of the Control of Agar (No. 1) Order, 1943, may be obtained from HM Stationery Office, or through any bookseller.

PROTOZOAN INFECTION IN PENNSYLVANIA

A SURVEY of protozoan infection of the staff of the Graduate Hospital of the University of Pennsylvania by M. M. Rothman and M. Laskey (*Amer. J. med. Sci.* 1943, **206**, 369) is, we believe, the first of its kind. Stool examinations were made in wet preparations, both in saline, in Lugol's iodine solution, and subsequently in films stained with Heidenhain's iron hæmatoxylin. In computing results no infection was attributed to a particular species, unless verified on a stained slide, but exceptions were made for cysts of *Entamœba coli* and *Giardia intestinalis*. Among the 306 persons examined the incidence was unexpectedly high—44% (or total identified protozoa 37·2%). Of those identified *Entamœba coli* formed 17·3%, *Endolimax nana* 12·7%, *Giardia intestinalis* 10%, *Entamœba histolytica* 3·6%, *Dientamœba fragilis* 2·3%, *Iodamœba butschlii* 0·7%, *Chilomastix mesnili* 0·7% and *Enteromonas hominis* 0·3%. The percentage infection was slightly lower for negroes—33% in 93 negroes against 38·3% in 213 whites. The staff of the record room and business offices showed the highest incidence, but the occupational differences were not significant.

BACTERICIDAL ENZYMES IN MILK

IN war-time all sorts of implements and inventions are investigated in the hope of discovering new arms of military importance. Many of the things studied prove unsuitable as weapons against the enemy; but generally the time spent on them has not been wasted, since the field of knowledge has been widened. As in war against the human foe, so it is in the struggle against bacteria. The latest illustration of this parallelism is provided by the history of material provided from penicillium.

Prof. H. Raistrick and his colleagues showed in 1942 that protein fractions of *Penicillium notatum* were bactericidal in a manner different from that of penicillin. They named the new substance notatin, and identical substances were reported almost simultaneously under the names of penatin and penicillin B. The substance was extremely active as a bactericide for many organisms in vitro, provided glucose was present, but it had little therapeutic action when tested in vivo. Eventually J. H. Birkinshaw and Raistrick (*J. biol. Chem.* 1943 **148**, 459) showed that notatin is a glucose oxidase which catalyses the oxidation of glucose to gluconic acid, during which process hydrogen peroxide is produced as a by-product. Since many of the common pathogenic bacteria lack the enzyme (catalase) which destroys hydrogen peroxide, they are soon killed by it in vitro, for hydrogen peroxide is poisonous to bacteria.

Although glucose oxidases have been known for some time, this discovery has attracted attention to them again. They are mostly flavoproteins—i.e., proteins containing a yellow group like riboflavin—and their molecular weight is about 74,000. They occur in the common moulds, especially in *Aspergillus niger*, and also as xanthine oxidase in milk. Xanthine oxidase is easily detected chemically by its power of oxidising hypoxanthine to xanthine and to uric acid with the production of hydrogen peroxide as a by-product already mentioned. Accordingly it seemed possible that the naturally occurring xanthine oxidase might be used to control bacterial growth. Experiments by F. Lipmann and C. R. Owen (*Science*, 1943, **98**, 246) showed that the enzyme will certainly prevent the growth of *Staphylococcus aureus* in vitro when

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hypoxanthine is present. Practical tests were then made by adding hypoxanthine to raw milk (which contains the enzyme naturally). When the milk was incubated at 37° C. the enzyme was unable to check the luxuriant growth of the staphylococci, but when it was incubated at 23–25° C. the growth of bacteria was appreciably diminished. The diminution, however, was not great enough to be satisfactory for practical purposes, perhaps because of the instability of the enzyme; and it seems likely that, despite the ingenuity of the investigators, the bactericidal power of glucose oxidases will prove to be of greater interest academically than practically.

Nutrition Society

The first of two conferences on budgetary and dietary surveys of families and individuals is to be at the London School of Hygiene, Keppel Street, W.C.1, on Feb. 5. At this meeting the methods of making the surveys will be discussed and the relation of expenditure on food to other family expenditure. Sir John Orr, FRS, will be in the chair and the speakers will include: Mr. A. G. Jones (Ministry of Food), Mr. E. R. Bransby (Ministry of Health), Mr. F. le Gros Clark (Children's Nutrition Council), Mr. L. Moss (Wartime Social Survey), Prof. M. Greenwood, FRS (London School of Hygiene), Mr. A. Bradford Hill, D SC (Air Ministry), Prof. A. L. Bowley (Institute of Statistics, Oxford), Mr. D. Caradog Jones (School of Social Sciences, University of Liverpool) and Dr. E. H. M. Milligan (MOH for Glossop). At a second meeting in London during May there will be discussions on the data obtained from analyses of institutional diets, methods used in the preparation of food and the laboratory assessment of the nutritive value of meals. Further particulars may be had from the hon. secretary, Mr. L. J. Harris, D SC, Nutritional Laboratory, Milton Road, Cambridge.

Royal Society of Medicine

A general meeting of fellows will be held on Tuesday, Jan. 18, at 4 PM. Cases will be shown at the meeting of the section of dermatology on Jan. 20, at 4 PM. There is to be a discussion on Jan. 21 at 4.45 PM, at the section of radiology, on radiotherapy in chronic inflammatory conditions with special reference to mycotic infections. The opening speakers are to be Squadron-Leader Alexander MacGregor, Dr. John Blewett, and Mr. I. G. Williams. The section of obstetrics and gynæcology will meet at 5 PM on the same day when Dr. Barbara Field will describe twins with contrasting blood-picture and Dr. Ninian Falkiner will read a paper on placental circulation.

Order of St. John of Jerusalem

The King has sanctioned the following promotions in, and appointments to, this order:

As Knights.—Henry Albert Beatty, MD, Major-General Samuel Roy Burston, CB, CBE, DSO, VD, MB, Colonel John Arthur Hopkins Sherwin, MD, Thomas Herbert Goddard, CBE, MB.

As Commanders.—Lieut.-Colonel Oscar Anson Cannon, MB, FACS, Lieut.-Colonel Freeman O'Neill, MD, Athol Walter Drayton Mobbs, MB, John Rodley, MRCS, Dame Louise McIlroy, DBE, MD.

As Officers.—Lieut.-Colonel Charles George Booker, MB, Esca Morris Humphery, MB, Major Leslie Haden Guest, MC, MRCS, MP, Lieut.-Colonel Geoffrey Dix English, MB, Lieut.-Colonel George Patrick Howlett, MD, Colonel Daniel Sayre Mackay, MD (since deceased), John Ernest O'Donnell, MD, Maurice Joseph Kelly, MD, Allan Reid Morton, MD, Ralph Roylance Scott, CMG, MC, MB, Duncan McFadyen Millar, OBE, MB, William Edward Peck, MB, Leonard John Dunstone, MB, Francis William Vint, MD, Charles Nixon Groves, CBE, MD, Wilfred Macaulay Brennen, FRCS, Rupert Palmer, MRCS, Captain Arthur Edwin Ernest Grounds, MB.

Ex-Services Welfare Society

Lord Horder will preside over the eighth annual medical conference at the Waldorf Hotel, Aldwych, London, W.C.2, on Tuesday, Feb. 8, at 10.30 AM. It is thought that the views expressed at the conference will be of value to the meeting of industrialists and trade-union leaders which the society has convened for Feb. 11, when proposals for the rehabilitation of nervously disabled Service personnel will be discussed.

Biochemical Society

A meeting will be held at the British Postgraduate Medical School, Ducane Road, Hammersmith, W.12, on Saturday, Jan. 22, at 11.15 AM.

Hospital Saving Association

The association has paid £170,000 to the London voluntary hospitals as a final distribution for 1943, bringing the total for the year to £600,000.

Medical Honours

The following awards have been made for gallant and distinguished services in the Middle East and Malta.

CBE.—Colonel J. R. Boyd, MD EDIN., NZMF; Brigadier G. W. B. James, MD LOND., RAMC; Colonel R. H. Lucas, FRCSE, RAMC; Colonel D. C. Scott, MRCS, RAMC; and Brigadier R. F. Walker, MB BELF., RAMC.

OBE.—Lieut.-Colonel R. J. V. Pulvertaft, FRCP, RAMC; and Lieut.-Colonel R. E. Tunbridge, MD LEEDS, RAMC.

MBE.—Captain J. R. Bolton, MB CAMB., RAMC; Major R. B. Robertson, MB ST. AND., RAMC; Major F. G. Summers, RAMC; and Major F. W. White, RAMC.

Eugenics Society

At 5 PM on Tuesday, Jan. 18, Lord Horder will take the chair at a debate on the motion that the programme of social security set out in the Beveridge report should be supported on eugenic grounds. The speakers are to be Mrs. E. M. Hubback, Mr. G. Mitchison, Mr. Cecil Binney and Mr. E. J. Lidbetter, and the meeting will take place at the rooms of the Royal Society, Burlingtom House, Piccadilly, London, W.1.

National Council for Mental Hygiene

Twelve lectures on frustration and fulfilment in adolescence are to be given at the Caxton Hall, S.W.1, on Tuesdays, at 5.15 PM, from Jan. 18 to April 4. The speakers will be Dr. J. A. Hadfield, Dr. Paula Heimann, Mr. R. W. Moore, Mr. T. F. Coade, Miss L. V. Southwell and Miss Olive Willis. Further information from the secretary of the council, 39, Queen Anne Street, London, W.1.

Appointments

ALLEN, R. B., MB DURH.: examining factory surgeon for Consett, co. Durham.

FRAZER, EMILY M., MB LOND.: temp. asst. MOH and school MO for Wimbledon.

LYALL, ALEXANDER, MD, CHM GLASG., FRCSE, FRFPS: surgical specialist to the Greenock Royal Infirmary.

MCADAM, A. L., MD GLASG.: examining factory surgeon for Darwen, Lancs.

MCKENZIE, ALAN, FRCSE: asst. surgeon to the Abbotsfield Hospital, Flixton, Manchester.

Births, Marriages and Deaths

BIRTHS

BLACK.—On Jan. 7, at Camberley, Surrey, the wife of Lieut.-Colonel J. Gordon Black, RAMC—a son.

DE VINE.—On Dec. 27, the wife of Major P. Brennan De Vine, RAMC—a son.

HORTON.—On Dec. 28, in London, the wife of Lieutenant J. A. G. Horton, RAMC—a son.

REECE.—On Jan. 8, at Redruth, the wife of Dr. Richard Reece, of Tintagel—a son.

RUNDLE.—On Dec. 29, the wife of Mr. Francis Rundle, FRCS—a son.

WILSON.—On Jan. 2, at Perranporth, Cornwall, the wife of Lieutenant C. M. Wilson, RAMC—a son.

MARRIAGES

COWDELL—JONES.—On Jan. 1, at Oxford, Richard Hugh Cowdell, BM, to Kathleen V. A. Jones.

ENGLISH—GEORGIADIS.—On Jan. 8, in London, Wilfrid Elliott English, major RASC, to Aitolia Georgiadis, captain RAMC.

FRANKLIN—MCILROY.—On Dec. 22, at Peebles, Conrade Franklin, MRCS, captain RAMC, to Margaret Clarke McIlroy.

GILES—WATERHOUSE.—On Dec. 31, in London, James Alred Giles, MB, to Nourah Waterhouse.

HADEN GUEST—MACQUEEN.—On Jan. 10, in London, L. Haden Guest, MC, MRCS, MP, to Edith MacQueen, of Braintree, Essex.

KININMONTH—WILLIAMS.—On Jan. 8, at Blundellsands, Denis Alexander Kininmonth, MB, to Margaret Isabel Williams, LDS.

MORONEY—HILL.—On Jan. 7, at Sherborne, Patrick Brendan Moroney, FRCS, surgeon commander RNVR, to Rhoda Mary Hill, ARRC.

PALLOT—WILLIAMS.—On Jan. 6, in London, J. Michel Pallot, MRCS, to E. M. (Penelope) Williams.

PATERSON—RHODES.—On Jan. 8, in London, James C Paterson, lieut.-colonel REME, to Margaret Patricia Rhodes, captain RAMC.

ROWLANDS—SWEETING.—On Jan. 10, at Birmingham, Aylmer John Denton Rowlands, LRCP, to Muriel Sweeting.

VARIAN—BULLEN.—On Jan. 1, at Torquay, George Varian, MD, to Carol Aveling Bullen.

DEATHS

GREEN.—On Jan. 7, at Woodside, near Stroud, Reginald Green, MD, D HY DURH., DPH.

THOMSON.—On Jan. 6, George Thomson, MB EDIN., of Canford Cliffs, aged 88.

VICKERY.—On Jan. 9, at Weston-super-Mare, William Henry Vickery, FRCS, aged 80.

WILLWAY.—On Jan. 6, Francis Wilfred Willway, MD, MS LOND., FRCS, of Clifton, aged 36.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export.

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ENDEMIC GOITRE IN ENGLAND
ARGUMENT FOR PREVENTIVE ACTION

MEMORANDUM OF THE GOITRE SUBCOMMITTEE, MEDICAL RESEARCH COUNCIL

THE field of preventive medicine continually extends its boundaries. In the course of the past century we may recognise three main phases of activity. The first was concerned with the improvement of sanitary conditions and the coincidental attack by other means on the acute infective diseases. The second maintained the work of the first and launched the attack on the chronic infective diseases, notably tuberculosis and venereal disease. The third continues the work of the first two, and applying new knowledge—particularly that derived from fundamental nutritional research—has already contributed to the reduction of important diseases unassociated with bacterial infection. Nutritional deficiencies with their clinical consequences have been recognised not only in respect of the accessory food factors but also of protein and certain essential elements, the most important of these being iron, calcium and iodine.

CAUSES OF SIMPLE GOITRE

While steps are being taken to ensure for the nation an adequate supply of protein, vitamins, calcium and iron, we have good reason to believe that a not inconsiderable section of the community continues to suffer from iodine deficiency of which simple goitre is the gross manifestation. Notwithstanding that other factors besides the specific deficiency probably contribute to the development of the disease, the experience of other countries enables us to claim that the incidence of simple goitre could be very appreciably reduced by iodine supplements. These are most conveniently provided as iodised salt.

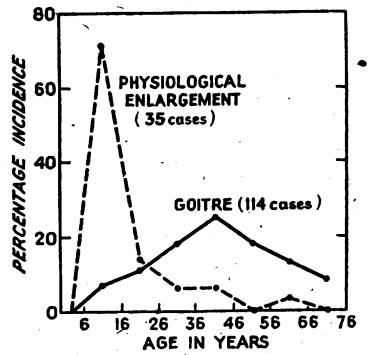
The type of goitre associated with iodine deficiency—"simple goitre"—occurs both sporadically, and, to a varying extent in different countries, as an endemic condition. Certain areas of England have long been noted for its prevalence. Simple goitre is of itself rarely serious, but it is indicative of an underlying constitutional disorder. The immediate cause of simple goitre is failure of the thyroid gland to obtain a supply of iodine sufficient to maintain its normal structure and function. This failure is usually brought about by an absolute environmental deficiency of iodine; it may also be caused by factors which interfere with the availability of dietary iodine or which impose an abnormal demand on the thyroid gland. Among the various accepted ætiological factors age and sex are well known. In zones of high endemicity thyroid enlargement begins in childhood and adolescence, but the more pronounced and irreversible changes in the gland seldom appear before adult life, when colloid and nodular goitres are chiefly seen between the ages of 30 and 50. The incidence in this country is always much greater in women than in men. Certain geographical situations and geological formations appear to have a definite influence, and the association with mountainous districts has long been recognised, but the disease is by no means confined to such districts; nor is it absent from coastal areas. It occurs in all continents and is more common among poor rural populations.

Where goitre is endemic the iodine content of the water-supply is usually lower than in areas where the condition is rare or absent. Even in areas in which closely comparable living conditions prevail and the water is drawn from the same source, some families appear to be more liable to goitre than others. The work of McCarrison (1928), carried out over a period of many years in India, drew particular attention to the factor of water contamination, but this is probably of minor importance in the western hemisphere. When or where the consumption of sea fish or sea food in general is low, the disease is more liable to arise, since these products are the only rich source of iodine among ordinary articles of food. There was a rise in the incidence of simple goitre in this country towards the end of the last war (Eason 1939), which may have been due partly to the failure of fish supplies, a liability prevailing at all times in the more remote inland villages. There are some grounds for supposing that a rise in incidence is in progress now and for the same reason. But the important fact remains that, however many contributory factors may be involved, prophylaxis with iodised salt can be accepted as the most simple and effective measure of control. Such prophylaxis, however, cannot absolve a nation from the duty of improving nutritional and environmental conditions in other ways.

CLINICAL FEATURES

A simple goitre may be inconspicuous to the ordinary observer or may become very conspicuous and unsightly. On æsthetic grounds alone there are very few owners of goitres who would not rather be without them. Much more common in women, they must frequently occasion shyness and unhappiness and even sometimes lessen the prospects of marriage. In their more advanced stages they cause discomfort and inconvenience and sometimes pressure symptoms, and lead to operations for these reasons. Some of them undergo nodular changes, and in an undetermined proportion of such cases secondary thyrotoxic manifestations, with particular effects on the heart, make their appearance towards middle life. Many patients with simple goitre admit to indefinite symptoms or to states of tiredness which they accept as due to the ordinary stresses of life. We do not yet know to what extent and in what ways the presence of a goitre or the iodine deficiency which determines it, or both, may affect the general health. Eason (1939) drew particular attention to the association of anæmia with simple goitre, finding it in 75% of his cases. This may, however, be due to an associated iron deficiency. In regions where goitre has long been endemic, cases of cretinism are also recognised and the incidence of deaf-mutism is said to be higher.

There is no definitely proven ætiological or geographical association between the simple types and stages of goitre (parenchymatous, colloid or nodular, with or without secondary thyrotoxicosis) and thyrotoxicosis with diffuse enlargement, or true Graves's disease. At the time of adolescence in girls a slight soft enlargement of the gland is common and is then often referred to as "physiological" or "adolescent" enlargement. This enlargement may persist into young womanhood and is often consistent with full health and activity. This state is to be distinguished from the more persistent enlargements which ultimately lead to established goitres with colloid degeneration. In what proportion of cases the soft enlargements of early life are followed by the development of indisputable goitre is not yet known. There is, however, evidence that the incidence of such enlargements is considerably higher in goitrous districts. The distinction between the earliest parenchymatous stage of goitre and adolescent enlargement can best be made in the individual case by observation over a long period, by its unduly early arrival or too long persistence. McCarrison (1928), by following the ratio of thyroid weight to body-weight in several species of animals, demonstrated the natural increase in size of the gland which attains its maximum just before the beginning of sexual maturity. Fluctuations in the size of the gland with the menstrual cycle and pregnancy in young women are well known. A survey recently carried out in an Oxfordshire village, employing clinical standards described below, gave the results illustrated in the figure. These indicate the very different "peaks" in respect of age-incidence for "physiological enlargement" and "established goitre."



Percentage distribution, according to age, of "physiological" thyroid enlargement and goitre.

METHOD OF EXAMINATION

For purposes of examination and record, where a goitre survey is undertaken, it is necessary to lay down

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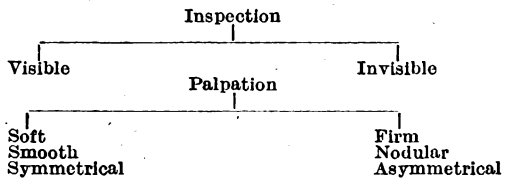
some simple standards and rules of observation. The following suggestions were drawn up on the basis of a preliminary examination of upwards of 100 factory girls and women at full work and for the most part in good health.

The neck should be examined in a good tangential light —preferably daylight—and the gland should be inspected both at rest and on swallowing. It should then be palpated with the finger tips of both hands from in front and behind. Its characters are recorded under the following headings:



A gland which is visible (or invisible), soft to palpation, smooth and symmetrical, provided it comes within the appropriate age-period (15–25 years), is regarded as showing physiological enlargement. The larger its size the less likely is it to come, or to remain, within the physiological group. If, in addition to being visible, it is firm or asymmetrical or nodular, or shows any combination of these characters, then it is regarded as an established goitre. Some very large goitres with colloid degeneration are soft, but their size and asymmetry or nodular irregularity, as well as the quality of the softness, readily distinguish them. A further distinction between the physiological enlargement and the established goitre is that the lateral lobes of the former tend to be partially concealed by the sternomastoid muscle and where they protrude from it to have diffuse and indistinct boundaries, while those of the latter tend to be better defined and to protrude clearly beyond the overlying muscle and are more readily grasped between the fingers.

GEOGRAPHICAL DISTRIBUTION OF GOITRE IN BRITAIN

There is no evidence that the geographical distribution of goitre in England, Wales and Scotland today is different from that found 20 years ago by the Board of Education (see Stocks 1928), and 40 years ago and earlier by Sir James Berry (1901), and other observers (see Joll 1932). In some areas where goitre was formerly prevalent recent observations have shown that it remains so.

In the Board of Education survey of 1924, 375,022 children aged 12 years were examined. Although it should again be emphasised that an enlarged gland does not necessarily imply an established goitre, the rates per cent. for enlarged glands in boys and girls respectively in areas of high incidence varied as follows.

BELT OF HIGH INCIDENCE

Area	*Boys*	*Girls*
Cornwall ..	4·84 ..	17·05
Devon (rural)	8·38 ..	18·57
Somerset (rural)	19·52 ..	28·70
Gloucestershire (east uplands)	7·53	
Oxfordshire ..	11·39 ..	37·22
Bucks ..	7·58 ..	11·46
Northants ..	4·20 ..	10·26
Rutland ..	20·87	
Leicestershire	3·02 ..	13·36
Notts (south)	5·59 ..	15·01
Derbyshire ..	5·15 ..	11·87
Northumberland (west)	9·78 ..	25·20
Durham (Weardale)	18·57 ..	34·94

OFFSHOOTS

Hants ..	5·90 ..	13·28
Isle of Wight	19·01 ..	36·45
Carmarthen	5·41 ..	15·92
Cheshire (S-W)	10·05 ..	16·83
Kent (S-W)	8·45 ..	28·01

The general picture is thus one of high incidence in a belt extending from Cornwall north-eastwards through Somerset and between the Cotswold and Chiltern Hills into Northamptonshire. Thence it extends northwards into Derbyshire, into Cumberland, West Durham and Northumberland. Offshoots extend from Wiltshire to the Isle of Wight, across Hereford into South Wales and across Cheshire into North Wales. A small area is found where Sussex joins south-west Kent. In certain districts of former high incidence, particularly in Somerset and Derbyshire where extensive alterations have since taken place in water-supplies, goitre is less prevalent now than it was 30 or 40 years ago, but in other areas recent examination of a number of otherwise satisfactory water-supplies has shown a low iodine content (Simpson 1942, 1943).

INCIDENCE

It is estimated that there are in England and Wales at the present time some 500,000 cases of thyroid enlargement in persons of ages 5–20 years inclusive. It cannot, however, be said what proportion of these represent transitory enlargements having no effects on general health and not destined to pass on into the stage of established goitre. On the other hand these figures do not take into account the period of life in which established goitre predominates. The total number of cases of established endemic and sporadic goitre in the whole country must be very considerable. In the endemic zones cases can be seen in the streets or public vehicles by those on the look out for them, or indeed by any ordinary observant person, with sufficient frequency to occasion comment. In a recent study of a north Oxfordshire village at least one person in ten of the population showed enlargement of the thyroid gland. One assistant medical officer of health working in an agricultural county of reputed low incidence, has collected 80 cases of conspicuous goitre during the past 2 years among women attending infant-welfare clinics.

PREVENTIVE MEASURES

General improvements in social and nutritional standards with a good mixed dietary including sea fish (which has a high iodine content), and improved water-supplies, would be likely in the course of time to reduce the incidence of goitre. Changes of water-supply on a community scale are at present impracticable and, however necessary they may seem on general grounds, would be a large undertaking for many of the more scattered villages where the disease has long been endemic. The ultimate aim of national goitre prophylaxis by iodine is the elimination of all forms of endemic goitre and cretinism. Marine (1924) has said "Simple goiter is the easiest and cheapest of all known diseases to prevent and its control may be accomplished by available methods as soon as organised society determines to make the effort. The prevention of goiter will mean a great deal more than eliminating this form of cervical deformity. It means in addition the control of those forms of physical and mental degeneracy such as cretinism, mutism and idiocy, which are dependent upon thyroid insufficiency." In addition we may add that many surgical operations would be avoided and improvements in general health might reasonably be anticipated.

Large-scale prophylaxis in various parts of the world, including Switzerland, Poland and the United States of America (see Transactions of Third International Goitre Conference, Washington, DC, 1938), has already proved the efficacy of the administration of iodised salt. The actual consumption of the salt has in most cases been voluntary and encouraged by educational campaigns. In Poland, where there was a government monopoly in salt, the whole supply to certain provinces was iodised.

On the combined experience of other countries it is agreed that for this country a salt containing 1 part of potassium iodide in 100,000 parts of salt would be convenient and effective. With an average daily intake of 10 grammes of salt per head this would provide 0·1 mg. of iodide (= 0·076 mg. iodine) per head daily. No ill effects are to be expected from the widespread use of iodine in such minute concentrations. Indeed the bulk of the evidence is to the contrary. In order to reduce the goitre we have in our midst and prevent a possible further increase during periods of restricted diet due to war and postwar conditions, it seems desirable that such measures should be put into force without delay.

A net intake of 8 lb. of common salt per head per annum by a population of 45,000,000 persons gives a total intake of 160,000 tons of salt. Iodisation at the recommended rate of 1 part of potassium iodide in 100,000 parts of salt would thus involve a consumption of 1·6 tons of iodide per annum for the whole country. The extra retail cost per head for iodised salt would, it is estimated, not exceed four pence per annum.

Iodised salt is already available by private purchase. Individual medical men have commended its use within the districts which they serve and through the medium of the medical journals. There has, however, been no public demand for it and no official pronouncement in favour of its general employment.

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The recommendation that a national prophylactic programme should now be seriously considered is based not only on the experience obtained in other parts of the world and on the literature of the subject, but also on the study of material collected in this country during the course of recent surveys carried out with the support of the Lister Institute, the Medical Research Council and the Institute of Social Medicine, Oxford, the details of which will be published later.

If, as now seems apparent, it has proved possible during a long and exacting war to protect the health of the people by national measures against protein, vitamin and other deficiencies, it becomes difficult to discover valid reasons for withholding this additional measure of protection.

RECOMMENDATION

The Goitre Subcommittee of the Medical Research Council strongly urge the adoption of a national policy of adding a trace of iodine to all common salt consumed in the country. The proportion recommended is one part of potassium iodide to one hundred thousand parts of common salt.

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FORWARD SURGERY IN A BATTLE PERIOD

G. K. HARRISON, MD TORONTO, FRCS
MAJOR RAMC

THESE remarks originate from experience with a field surgical unit between Nov. 23 and Dec. 5, 1942, during the battle of El Alamein. The unit worked with the main dressing-station (MDS) of a field ambulance, relatively near the line, and our task was to deal with cases which could not survive further evacuation before surgical help was obtained.

The experience was brief but intense and was permeated with the spirit of a great army in a great victory. It gave an insight into a form of surgical activity with its own standards—where reward and pleasure in the work are hard come by, and where, though it is great, satisfaction is rarely to be gained except in the bare saving of life. Such work affords small place for patient-surgeon relationship, for diagnosis, or for fine technique, and successes are all too few. On the other hand, in some way hard to explain, it related surgery, bared of trappings and pomposity, with its limitations and unknowns, to other spheres of simple primary human endeavour, and put it in a perspective not so clearly seen over the undraped body in the theatre of a great clinic.

The tendency, with so many desperate cases to hand, was to attempt too much. Reserves of energy were used up lavishly; it was only as fatigue and repeated failure made their mark that one began to wonder.

In ordinary life one may use time to help decide treatment. In a battle, with cases piling up, there is seldom place for this. The only time is now, on the spot. One aims to do the minimum necessary to save life, but often the minimum is the maximum. One must be able to sense or be told what is happening behind, and work in with the whole picture, rather than feel that one's responsibilities cease as soon as the patient is evacuated. In the casualty-clearing station and base hospital conditions may be just as hectic as in the forward area. In these units priority is again given to the cases that are relatively likely to benefit. With travelling and waiting, a crucial 4 to 5 days may pass before further treatment is possible.

When only borderline cases are treated in a forward area, every survival is urgently needed to justify the surgeon's position. Any death due to lack of primary radical surgery at his hands is keenly felt, and its impression is not lightened by a great preponderance of successes. He is not interested in sending on potential lethal injuries as challenging problems to other surgeons if it can be avoided. These points are mentioned to justify the opinion that in a battle there must be a change-over from peace-time—or even quiet war-time—conservatism towards radical surgery.

Exasperatingly few post-mortems could be done. One wished to be assured that those specially trained in such work and with time to do it were better employed elsewhere than where the rapid deaths were occurring.

An outline of the cases treated and some relevant information is given in an appendix, but the opinions expressed are based on previous and later experience as well.

BLOOD-TRANSFUSION

Blood and plasma had amazing power to resuscitate the vascular system as measured by restoration of blood-pressure and pulse. Often, however, the tissues outside the blood-vessels did not share in this restoration, as measured by the patient's ability to withstand anæsthesia, operation, residual trauma and infection. With very adequate supplies of blood and plasma available, almost all patients could be made ready for operation; but this was a different thing from ultimately saving their lives.

Whether the blood-using tissues, in contrast to the blood-carrying tissues, suffer from wounding otherwise than through reduction in the volume of circulating blood remains a question. Perhaps the future will disclose something useful in addition to blood and plasma for restoring the body to its state previous to severe trauma.

As time went on, the BP proved to be the best single guide to the state of the circulatory system, but the general picture of the patient on admission became more important in estimating whether he was going to live or not. The doleful significance of cyanosis, variations in respiratory rate and depth, and noisy breathing, of loss of mental energy as shown in an unmoving face, weak voice and faltering physical acts, and of extensive trunk or near trunk wounds, gradually made a deeper and deeper impression.

AMPUTATIONS

So much is written about fine points in deciding whether to amputate or not, and about the technique of amputating, that one may forget more important matters.

It seems true that in cases of doubt an immediate amputation will almost surely save life. The decision to amputate does not only rest on what presents at the moment; one must picture the patient through the next days, weeks and months. Is one going to make sure of saving life now, or to send him travelling, dependent for his life upon skilled observation and judgment at short intervals, with the possible need for immediate amputation above a grossly septic field at short notice?

Particularly difficult decisions have to be made in gross injuries to the knee and ankle joints, and in multiple injuries to an extremity with proximal or associated damage to a main vessel. The former knee-joint cases are not common, but they are particularly significant, since they can almost certainly be saved by early amputation.

When the surgeon's mind shifts from saving the knee-joint to saving the limb, it is time to think of amputation. When the joint is widely exposed, with compound comminution of one or more condyles, a suppurative bone and joint lesion may be accepted as a certainty. Once beyond a very ill-defined stage, in a considerable proportion of these cases, amputation will not stop their progress to death. Whatever the brilliant results obtained after months of treatment in a few cases, I believe that the forward surgeon takes responsibility for unnecessary deaths when he sends back grossly shattered knee-joints.

The problem of a patient with both knees so damaged is fortunately not often met. The joy of a German prisoner to find himself alive and able to move two stumps after double thigh amputation made one realise that it was not for the surgeon to decide what made life

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worth or not worth living for somebody else. This man had crawled about for 15 hours with both legs shattered through and below the knee-joints, with the stripped tibial vessels covered in dirt and twitching like snakes with each heart-beat; a man of indomitable spirit.

Another type of case where primary amputation may be performed to save the maximum number of lives at the expense of a number of limbs is one in which there are multiple injuries distal to a damaged main blood-vessel. For instance, a case with damaged superficial femoral artery, and multiple small penetrating and perforating wounds in the leg and foot. There is more to it than the temperature, colour, sensation and movement of the toes. If the wounds are well opened and drained, a fulminating 3-day gas-gangrene infection is unlikely, but a slow infection develops in the anæmic muscle which has great general toxicity. It damages the heart and kidneys, and in war-wounded bodies a low-grade cumulative septicæmia is not uncommon. Whatever the mechanism, once such an infection is established, a significant number of these patients go on slowly to death even after removal of the leg.

When so many lives are being lost inevitably, it is unsound to attempt a line of treatment which demands the utmost both of surgery and the surgeon, as an alternative to life-saving certainty.

One case with a wide gash in the upper thigh, and the torn superficial femoral artery and vein clearly seen, but with no distal wounds, recovered without losing his leg. The shallow large thigh wound was completely excised.

A few points of technique seem to cover most forward-area amputations. The bone was sawn through as far distally as allowed the formation of loose viable flaps and the removal of damaged bone and muscle. When this could be done, safely and with little waste, at the site of election, so much the better. Whether the suture line was transverse or anteroposterior, in front of or behind the mid-line, seemed of no importance compared with getting long loose flaps. There was no prefixed idea as to the shape of the flaps, although they could often be cut so as to conform to normal custom. The amount of retraction of the flaps up the œdematous limb was frequently startling. Space must be allowed under the flaps for through-and-through drainage. Flap stitches should be needed only to counteract the pull of gravity on the under flaps. Each stitch should be loose enough to allow the enclosed tissue to swell by a third, without pressure; about 2 inches was usually left between stitches. A final feel of the great trochanter, the patella, the acromion or the olecranon through the drapes sometimes adjusted a lost perspective. It was not as easy to judge the lines of incision to the best advantage as it was to find excuses for oneself when confronted with an unsatisfactory result.

To make it easier for following observers to notice and remedy any trouble, it seemed best to cover the stumps with bandages rather than plaster. Bandages reinforced by strips of adhesive passing centrally on to the skin for 12 inches served the purpose.

In relation to amputation, 3 out of the 4 fatal cases reported in follow-up cards are interesting:

CASE 1.—Large perforating wound of left thigh, severing superficial femoral artery and vein; leg cold. Compound comminuted fracture of right femur, lower third. Wounds of buttock. Treatment: amputation through lower left thigh, opening and drainage of other wounds; fixation of right lower limb in plaster-of-paris and Thomas splint: Patient arrived at a base hospital at least 4 days later in a moribund state, and died 10 days after injury.

CASE 2.—Perforating ragged wound from the outer side right leg through popliteal fossa to inner side of thigh. Pulsating popliteal artery and adjacent chipped tibia felt in the wound. Eleven hours after injury the wound was opened and drained and a plaster cast applied and split. Amputation 10 days later at the base failed to prevent death from toxæmia and secondary hæmorrhage.

CASE 3.—Compound comminuted fracture upper end right tibia, compound comminuted fracture upper third right femur. Good blood and nerve supply to the foot. Wounds opened and drained. Split plaster-of-paris support. Death 9 days later.

ABDOMINAL WOUNDS

The outline of cases speaks for itself. There is some consolation in the fact that 4 negative laparotomies did well, in so far as it indicated that neither the operating conditions nor the operating were necessarily lethal. The 5 cases of bowel injury which did well were comparatively straightforward small or large bowel injuries, and were in good condition before resuscitation. As for most of the other cases, initiative to get on with the job in the abdomen, and courage to persist, were the prime requisites. One patient, whose post-mortem showed the abdomen to be healthy after suture of small bowel, died from a lacerated forearm.

The results depend largely on the condition before operation. This again depends on the time since wounding and the amount of injury to bowel, vascular and retroperitoneal tissue, and these factors are in inverse proportion to each other. The average time between wound reception and operation in the successful cases was 12 hours.

Exteriorisation of large-bowel injuries, either by colostomy or by double gun-barrelling after excision, was life-saving. The latter was tried for a small-bowel injury requiring excision. Gastric suction was necessary and was better used continuously than intermittently.

The high mortality associated with wounded retroperitoneal tissue, contaminated by fæces, shows the need for drainage. To provide adequate drainage and still enclose the bowels and make the patient fit for nursing is not easy. In the abdominal wall, as elsewhere, the effect of a high-velocity missile is beyond its track. The significance of retroperitoneal air as indicating retroperitoneal large-bowel perforation is helpful. The retroperitoneal holes in the large bowel were difficult, and in one case impossible, to find.

In exploratory abdominal incisions, the wound was made large enough to admit the hand. In one successful case an inserted swab was unstained but the examining hand found an abscess localised by omentum around a hole in the large bowel.

Thoraco-abdominal wounds were treated as essentially abdominal injuries, through an abdominal incision.

The following are notes of cases with injuries to solid viscera, on which post-mortems were done:

CASE 4 had a missile embedded in the liver entering the posterior aspect of the right lobe, and died of generalised gas infection 26 hours after operation.

CASE 5 had a missile perforating right and left liver lobes after passing through the lower right pleural cavity. Death took place 9 days later from gross purulent destruction of the right liver lobe.

Both these patients had gauze packing in the bleeding liver hole for 3 days. The bleeding might have stopped without the packing.

CASE 6 had a piece of shell removed from the retroperitoneal region of the left kidney, and a low thigh amputation. Examination 5 days later showed a knuckle of small intestine adherent to the infected abdominal incision, and causing death by intestinal obstruction.

Of the remaining 7 cases 3 died within 26 hours of operation and 4 within 2–3 days. The causes of death were not clear without post-mortems. Of these 7 cases, 3 had a lacerated kidney for which nephrotomy was done, 1 had a transpleural perforation with ruptured spleen for which splenectomy was done, 1 had a lacerated kidney and spleen and both were removed. All the nephrectomies were done through the exploratory abdominal incision. Counter-drainage through the loin should be established after these operations.

Sulphadiazine was seen in fibrin-covered masses throughout the abdomen after its insertion in a case dying 3 days later from peritonitis. There were no adhesions to the fibrin masses up to this time, although they might have appeared later.

GAS GANGRENE

Although gas gangrene was unusual elsewhere, 8 cases were encountered. In 2 cases it developed after admission—once as described above, and once in an untreated thigh wound. The other 6 patients were admitted with gas gangrene; and this indicates the severity of

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the cases we were selected to receive. Of these, 3 were treated and recovered, and 3 were considered too far advanced to justify their receiving operating time. The 3 treated cases consisted of 1 compound fracture of thigh, 1 soft-tissue injury of thigh and 1 compound comminuted shoulder injury. The 3 untreated cases consisted of 2 thigh injuries and 1 abdominal injury.

In treatment the diseased tissues were ruthlessly cut away. Although soft-paraffin and sulphonamide gauze was applied to the wound, no faith was placed in its ability to influence the infection.

Only one follow-up card was received relating to the 3 cases leaving the MDS. This patient died 5 days later, and post-mortem showed toxic myocarditis and hepatitis. The wounds had been dressed under an anæsthetic the previous day and found satisfactory. This may indicate that cases recovered from gas-gangrene infection are still in a perilous state for some time.

These cases had fulminating gas gangrene with dreadfully placid countenances and were not confused with those of gas production in relatively mild infections.

WOUND TREATMENT AND CHEMOTHERAPY

With muscle wounds and most bone and muscle wounds, less than 10–15 hours old and free from gas-gangrene infection, one became confident that life would be saved if the wounds were cleaned and trimmed, opened up and drained, and the wounded part was immobilised.

Cleaning consisted chiefly in liberal douching with saline solution and wiping out the dirt with gauze. Trimming consisted in cutting off partially severed pieces of flesh and removing bone fragments without vascular attachment. Opening up consisted in lengthening the skin wound and cutting the fascial barriers in, around and beyond the wound so that two examining fingers could pass easily from a larger peripheral area into all parts of the wound. Drainage was established when two fingers could pass from a second aspect of the limb (posterior by choice) into the depths of the wound, and when a track was maintained through the wound by an object such as a strip of corrugated rubber. In shallow saucerised wounds up to a depth of about one-fifth the diameter of the limb, gauze was introduced without counter-drainage. The wounded limb was usually immobilised in a split plaster cast with secondary attachment to the trunk or to a Thomas splint if indicated.

Suppuration certainly occurred in wounds so treated, but the inflammation was localised and was due, at least in part, to formation of a line of demarcation between healthy and missile-damaged tissues. One did not see 2-day or 3-day spreading lethal infections, whether chemotherapy was used or not.

To know when wounds of extremities are so massive that the body cannot survive them after such treatment is a matter of experience. Three examples are given under amputations.

Whatever the future shows to be true of other fields of battle, it appears that some lives were saved by the treatment adopted, which would have been lost had time and energy been expended in a careful layer-by-layer wound excision. If time and facilities allow, fuller wound excision is indicated, provided the lives of waiting patients are not jeopardised; and if the man with multiple war wounds will stand up to the operation, this treatment is ideal.

The officers and men of the field surgical unit and the field ambulance share equally in any success obtained, and my appreciation is due particularly to Captains P. T. Ashby and David Dick, and to Corporal J. Stone. I am grateful to Lieut.-Colonel C. F. Mayne for constructive criticism.

Appendix

During the twelve days 61 cases were operated upon. Of these, 25 died without being evacuated; the other 36 were evacuated. Of 19 follow-up cards received concerning evacuated cases, 4 recorded deaths.

ABDOMINAL OPERATIONS (28)

(*a*) Laparotomy without findings, 4 cases, all evacuated.
(*b*) Laparotomy with findings, 24 cases, 5 evacuated.

Group (*b*) included 14 cases of bowel injury only, of which 5 were evacuated. Also 10 cases of injury to solid abdominal viscera, with or without thoracic injury, in which no bowel lesion was found; 10 died in MDS. For the 5 evacuated cases 4 follow-up cards were received; all well.

The average interval between abdominal wounding and operation was 11 hours. All abdominal cases admitted were operated upon except one with gas gangrene. Evacuation took place 5–7 days after operation.

AMPUTATIONS (18)

13 evacuated; 5 died in MDS.

Thigh 10, leg 4, arm 3, forearm 1. Almost all patients had multiple injuries.

Follow-up cards received, 9, recording 1 death.

MISCELLANEOUS OPERATIONS (12)

11 evacuated, 1 died in MDS.

Includes gross soft-tissue injuries, and compound fractures (other than femurs) without amputation.

OPERATIONS FOR FRACTURED FEMUR, WITHOUT AMPUTATION (4)

All evacuated.

2 follow-up cards: 1 well, 1 died.

OPERATIONS FOR HEAD INJURIES INVOLVING BRAIN (2)

1 evacuated, 1 died in MDS.

No follow-up card received.

GAS-GANGRENE INFECTION (6)

3 cases treated and evacuated.

1 follow-up card received regarding death (see text).

Excluding abdominal cases the average interval between wounding and operation was 12 hours. Most patients had multiple injuries, and 6 fell into more than one of the above groups. Cases other than those with abdominal wounds were usually evacuated within 48 hours of operation.

INTRAPELVIC RUPTURE OF URETHRA

B. C. MURLESS, MB CAMB, FRCSE, MRCOG
SURGEON LIEUT.-COMMANDER RNVR

IT is well known that intrapelvic rupture of the urethra associated with fracture of the pelvic bones causes severe shock and carries a high mortality. In the following case death was due to hæmorrhage rather than shock.

CASE HISTORY

A soldier, aged 19, was admitted to hospital 30 minutes after being run over by an army truck. Shock was fairly severe: mucous membranes rather pale; pulse 96, moderate volume; temp. 97° F. There was no visible bruising over the abdomen, back, or perineum. In the abdomen a symmetrical swelling was felt rising out of the pelvis to a point 1 in. below the umbilicus; in size and consistence it resembled a gravid uterus of 22 weeks, and it was acutely tender and immobile. There was tenderness over the fourth and fifth lumbar vertebræ and the right crest of the ilium. Radiography showed, on the right side, fracture of the upper ramus of the ischium and a dislocation of the sacro-iliac joint, with some upward displacement of the right iliac bone. On the left side there was a fracture of the lower ramus of the pubic bone at its junction with the ischium. No blood was seen coming from the urethra.

A diagnosis of intrapelvic rupture of the urethra or extraperitoneal rupture of the bladder was made. Morphine gr. ¼ was given, a heat cradle applied, and attempts at micturition forbidden. The patient was then removed to the operating theatre. Attempts to pass rubber and gum-elastic catheters failed, the hold-up being seemingly near the neck of the bladder. Withdrawal of the catheters was followed by passage of a little blood per urethram.

Half an hour had now elapsed since the patient's admission, and his condition had deteriorated. He was paler; the pulse was 100 and of poorer volume; the temperature remained at 97° F. in spite of the heat cradle, and the systolic blood-pressure was 80 mm. Hg. Intraperitoneal bleeding from a damaged viscus, in addition to the pelvic damage, was suspected, and 1 pint of plasma was given, followed by 2 pints of stored blood. The systolic blood-pressure rose to 105 mm. Hg and the pulse-rate dropped to 96. He was now considered fit for operation.

Operation.—A 4-in. midline incision was made above the symphysis pubis. Beneath the rectus sheath the pelvic

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cellular tissues round the bladder were found to be infiltrated with blood and clot which had pushed up the peritoneum and formed the abdominal swelling. The bladder itself was only moderately distended and was located with some difficulty; it was opened and found to be unruptured. Two metal sounds were then passed from the internal meatus and external meatus of the urethra, with the object of pulling through a rubber catheter by Banks's technique. Although the sounds could be made to contact, attempts at guiding the lower sound into the bladder were unsuccessful, and since the patient's condition was not good were soon abandoned. The end of the upper sound was cut down on in the perineum and a catheter passed out from the bladder. It was noted at this time that a small perineal hæmatoma had formed to the left of the midline. The peritoneum was now opened and resutured above the bladder to exclude intraperitoneal hæmorrhage. The bladder was closed round a suprapubic tube and a rubber drain placed in the cave of Retzius.

After operation a further pint of stored blood was given and morphine gr. ¼ injected. Immediate recovery was good and it was well maintained for 12 hours. Signs of further blood loss then developed, indicated by a rising pulse-rate and increasing pallor. Considerable oozing had occurred from the suprapubic incision round the tubes, but insufficient to account for the relapse in his general condition. Morphine was administered freely and a further pint of blood infused, followed by a pint of plasma. Response was only temporary, followed by further relapse. He died exactly 24 hours after admission, showing the characteristic signs of severe blood loss.

Post-mortem findings.—The general peritoneal cavity contained a little clear fluid but no blood. A great mass of blood-clot had infiltrated the pelvic cellular tissues and invaded the retroperitoneal tissues of the posterior abdominal wall. On the right the clot had ascended as high as the lower pole of the kidney, stripping the peritoneum from the right colic gutter and infiltrating the space behind the ascending colon. In places the colon itself was almost surrounded by clot. On the left the infiltration was less, the clot reaching to the midpoint of the descending colon. The bladder was not ruptured but its neck was displaced backwards and swung free in a mass of clot, the puboprostatic ligaments being torn through. The urethra was snapped off at the apex of the prostate gland. The iliac vessels were traced down through the extravasated blood from the aortic bifurcation and were found to be undamaged.

DISCUSSION

Differentiation between intrapelvic rupture of the urethra and extraperitoneal rupture of the bladder is nearly always hard and sometimes impossible. In this case the diagnosis was further complicated by the signs of blood loss, suggesting intraperitoneal hæmorrhage due to some further damage. The peritoneum was deliberately opened at operation to exclude this possibility.

Hamilton Bailey[1] points out that when extravasated urine causes a hypogastric swelling, this is usually greater on one side than the other. It is interesting to note that in this case, where there was no extravasation of urine, the large hypogastric swelling, due entirely to bleeding, was symmetrical. The severe shock seen in such cases is no doubt partly attributable to stripping of peritoneum by extravasated blood or urine. In my patient the peritoneum of the posterior abdominal wall was rapidly and extensively stripped, and the resulting shock must have been great; but the fact that he recovered well from the initial shock and operation points to hæmorrhage as the actual cause of death. This is borne out by the great quantity of blood found post mortem in the pelvic cellular tissues and the retroperitoneal tissues of the posterior abdominal wall. Such findings, it seems, are uncommon with ruptured urethra; the hæmorrhage usually ceases spontaneously, presumably from clotting and increasing tension in the tissues.

In the sources at present available to me I can find no mention of methods of controlling such bleeding. The offending vessel or vessels could not be discovered at autopsy, but it appears likely that the bleeding was arterial. Branches of the inferior vesical or middle hæmorrhoidal vessels are probably the most liable to damage in rupture of the urethra above the urogenital diaphragm with backward dislocation of the neck of the bladder. It should be possible to control such bleeding by firm packing round the neck of the bladder with flavine or sulphanilamide gauze at the time of the suprapubic operation, once a catheter is in place. This should not be difficult where the neck of the bladder has been dislocated and the peritoneum pushed up by hæmorrhage. The difficulty would be to decide whether the extra risk of sepsis, induced by leaving the packing for 48 hours, is justified in all cases, since the number where serious bleeding continues must be small. A better procedure might be to pack only at a second operation, undertaken because of continued hæmorrhage.

1. Bailey, H. Emergency Surgery, Bristol, 1938, p. 398.

IDENTITY OF PATULIN AND CLAVIFORMIN

E. CHAIN, PH D CAMB — H. W. FLOREY, M B ADELAIDE, F R S — M. A. JENNINGS, B M OXFD

Sir William Dunn School of Pathology, Oxford

WITH A NOTE ON THE CRYSTALLOGRAPHY

D. CROWFOOT, M A OXFD, PH D CAMB — B. LOW, B A OXFD

Department of Mineralogy, Oxford

THE isolation of a crystalline antibiotic produced by *Penicillium claviforme* has been described (Chain, Florey and Jennings 1942). The substance, which was named claviformin, was isolated from culture filtrates supplied by Wilkins and Harris, who were the first to describe the antibacterial activity of medium on which *P. claviforme* had grown (1942).

CHEMICAL IDENTITY OF PATULIN AND CLAVIFORMIN

As shown in table I, the analytical figures, melting-point and other chemical properties of patulin, the antibiotic recently isolated from culture filtrates of *P. patulum* and studied by Raistrick and his collaborators (Birkinshaw et al. 1943) are very similar to those of claviformin.

The formula $C_9H_8O_5$ was proposed for claviformin, but soon after the paper had appeared Crowfoot and Low showed that the molecular weight of claviformin, determined by X-ray crystallographic methods, had a value of 154 (± 4), which was incompatible with the formula $C_9H_8O_5$ and indicated the formula $C_7H_6O_4$. The corrected formula was to have been published last year in the annual reports of the Chemical Society, but publication has been delayed. The elementary formula for patulin, given by Birkinshaw and others (1943) is $C_7H_6O_4$; this formula is identical with that deduced from crystallographic X-ray measurements of claviformin

In view of the similarity between the chemical properties of claviformin and patulin the mixed melting-point of the two substances was determined.* The mixture melted at between 109° and 110° C.—i.e., without any significant depression of the melting-point of either substance. This finding strongly indicates the identity of patulin with claviformin. The final proof for the identity of the two substances has been obtained from crystallographic measurements (see below).

BIOLOGICAL PROPERTIES

The findings of Chain and others (1942) and of Hopkins (1943) agree well as to mouse toxicity (0·25–0·5 mg. intravenously killed) and antibacterial action. Gram-positive and gram-negative bacteria were both affected, and differences in the figures for the inhibitory dilution are probably explained by differences in the media and strains of bacteria used (total inhibition, Chain et al. 1 : 40,000 to 1 : 160,000; Hopkins 1 : 33,000 to 1 : 80,000). The main discrepancy lies in the effect of serum and the toxicity to leucocytes. Hopkins found that 10% of serum had no effect on the dilution at which inhibition took place. It was previously found with claviformin that the figure for complete inhibition suffered a reduction of the order of 50% in the presence of 10% serum, and this result has now been repeated (table II). A preparation of claviformin and one of patulin were both used and the results were identical. The tubes

* The patulin was kindly supplied by Dr. J. W. Trevan of the Wellcome Physiological Research Laboratories.

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containing the substance in broth were incubated at 37° for 4 hours before being inoculated with the organism.

The inhibitory effect was greatly enhanced by using 50% serum. This was shown by the plate and cylinder ring test. An equal amount of serum was mixed with an aqueous solution of the substance, to give a final dilution of 1 : 2000. Table III demonstrates that the ring showing activity was completely abolished when the solution was incubated with the serum for 5 hours before being put in the cylinder (upper two lines), and was substantially reduced when there was no preliminary incubation (lower two lines). Again there was no significant difference between the results given by the two preparations (see figure).

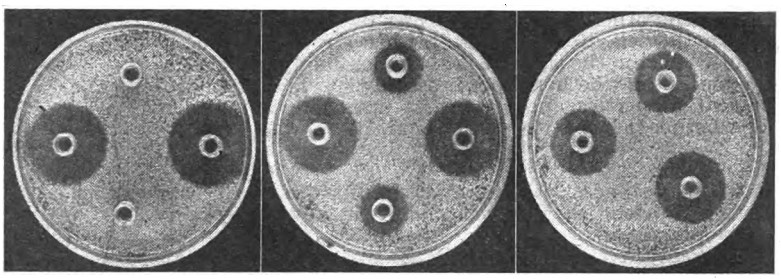

Plate and cylinder ring-test to show the effect of serum.—Plates seeded with a *Staph. aureus* culture diluted 1 : 1000. Claviformin and patulin were diluted 1 : 2000 throughout. After the solutions had been put in the cylinders, the plates were incubated overnight and ring diameters were read next morning. (Diameter in mm. shown in parentheses).

A—Solutions incubated for 5 hours at 37° C. before being put in cylinders.
Top : claviformin in 50% serum. (0) Left : claviformin in water. (30)
Bottom : patulin in 50% serum. (0) Right : patulin in water. (31)

B—Solutions put in cylinders without preliminary incubation.
Key as for A. Top (20) ; Left (30) ; Bottom (20) ; Right (30)

C—Penicillin for comparison. Preliminary incubation as in A.
Left : 2 units per c.cm., 50% serum. (26) Right : 2 units per c.cm., water. (27)
Top : 1 unit per c.cm., water. (24)

These results clearly explain the discrepancy in the toxicity to leucocytes, as the experiments of Chain and others were carried out in 10% serum and those of Hopkins in 50% reconstituted blood. The former found death in an hour at 1 : 800,000; the latter no effect on phagocytosis at 1 : 8000. The previous result with 10% serum has been closely repeated, with identical results for patulin and claviformin. At 1 : 200,000 the cells were killed immediately, at 1 : 800,000 all except an occasional cell were dead at the end of an hour and at 1 : 3,200,000, though all the cells survived for 3 hours, more were stationary or sluggish than in the control preparations.

TABLE I—COMPARISON OF CHEMICAL PROPERTIES OF CLAVIFORMIN AND PATULIN

—	Analytical composition C	H	N	Active hydrogen *	Melting-point	Molecular weight	Optical rotation	Reaction in water	Solubilities	Reducing power	Other properties
Claviformin ..	54·2	3·8	abs.	1 atom	110° C.	182 ±10% in chloroform	Inactive	Neutral	Soluble in water, alcohol and chloroform, but insoluble in petrol ether	Reduces ammoniacal silver and Fehling's solution	Slow formation of 2 : 4 dinitrophenyl hydrazone; yellow colour after treatment with alkali
Patulin	54·6	4·1	abs.	1 atom	111° C.	171 ±10% in dioxane	Inactive	Neutral			

* Zerewitinoff in pyridine.

CRYSTALLOGRAPHIC EXAMINATION

A year ago we examined by X-ray crystallographic methods the antibacterial substance isolated by Chain, Florey and Jennings (1942) from penicillium claviforme and named claviformin. Our measurements showed that the molecular weight of this substance was 154 ± 4 (Low 1943) and that its chemical formula was therefore not that at first proposed, $C_9H_8O_5$ (molecular weight 196), but $C_7H_6O_4$ (molecular weight 156), the same as that of patulin (Birkinshaw et al. 1943). We have now examined a sample of patulin, provided by Dr. J. W. Trevan and the X-ray photographs we have obtained prove that claviformin and patulin are identical. The crystallographic data are summarised below.

From the X-ray measurements it is possible to deduce the approximate size and shape of the molecule, and the dimensions calculated are in general compatible with the type of structure proposed by Birkinshaw and others. But one point is perhaps worth mentioning; in agreement with the observed optical inactivity of the preparation, the crystal symmetry shows that the compound either contains no assymmetric centre or is a racemate. The formula most favoured by Birkinshaw and his colleagues does contain an assymmetric carbon atom and could only be correct if racemisation had occurred, possibly through a tautomeric structure.

Crystallographic data.—The crystals are large monoclinic tables, (001) bounded by (11$\bar{l}$), (01$\bar{l}$). The plane of the optic axes is inclined at an angle of approximately 20° to the normal to (001), γ is parallel to b. The sign of the birefringence is probably negative. The unit cell dimensions are a = 12·42, b = 9·47, c = 7·78 A; β = 46·7°, correct to about 0·5–1%. The density is 1·528 ± ·003. Space group, P 2_1a, n = 4. Molecular weight calculated = 154 ± 4.

X-ray single crystal and powder photographs of patulin are completely superimposable on those of claviformin.

TABLE II—EFFECT OF 10% SERUM ON ANTIBACTERIAL ACTIVITY
(dilution test)

—	Dilution of substance 160,000	80,000	40,000	20,000
Bact. typhi:				
no serum	++	−	−	−
with 10% serum	++	+	−	−
Staph. aureus:				
no serum	++	++	+	−
with 10% serum	++	+	+	+

++ = full growth. + = partial growth. − = no growth.

DISCUSSION

Claviformin is a bactericidal agent, completely abolishing the respiration of suspensions of *Bact. coli* in a short time. Like all ordinary antiseptics, it is a general protoplasmic poison, exerting its toxic and antibacterial effect through combination with a protoplasmic constituent common to all cells. As far as its antibacterial activity

TABLE III—EFFECT OF 50% SERUM ON ANTIBACTERIAL ACTIVITY
(plate and cylinder ring test; ring diameter in mm.)

—	Plate seeded with broth culture— *Staph. aureus* undiluted	*Staph. aureus* 1:1000	*B. coli* undiluted	*B. coli* 1:1000
Preliminary incubation 5 hours				
50% serum	0	0	0	0
no serum	23·5	31	18	23
No preliminary incubation				
50% serum	18·5	20	13	22
no serum	23	30	18	26

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is concerned, therefore, it apparently has no advantage over some other more easily accessible antiseptics.

Whether claviformin (patulin) has any special therapeutic effect in the treatment of the common cold appears to depend on whether it possesses any specific pharmacological properties apart from its antibacterial activity or whether it has a viricidal action.

SUMMARY

The substances patulin and claviformin have been shown by chemical methods and X-ray crystallography to be identical.

Biological tests show that the antibacterial activity is reduced by the presence of serum, and that leucocytes are killed at concentrations smaller than those which are required to inhibit bacterial growth, confirming results previously published.

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REMOVAL OF ETHER VAPOUR DURING ANÆSTHESIA

H. G. EPSTEIN, D PHIL BERLIN

Nuffield Department of Anæsthetics, University of Oxford

THE explosion hazard is always present when ether is used in the vicinity of electrical equipment or an open fire, and the risk increases if a number of successive operations are carried out in a small room without effective ventilation. Certain kinds of activated charcoal will remove ether vapour from the expired air, and adsorbers filled with this material have been made and proved effective during long operations. In emergency, the canisters supplied with Service gas-masks can be adapted to the same purpose.

The weight of ether expired per minute varies fairly widely, but the concentration rarely rises above 8% (by volume). Ether vapour mixed with air or oxygen is explosive from 2% upwards to about 25% and 80% respectively. Since the upper limits of the explosive range are of no interest to anæsthetists, the ether concentration must be reduced below the lower limit to prevent explosion. Even if the ether concentration at the outlet of the adsorber is slightly above the lower limit, the risk of explosion is greatly diminished as dilution with the surrounding air takes place. In this inquiry the "break-point" was taken to be when the ether concentration in the expirations, after passing through the adsorber, rose above 1¼%. During laboratory tests the ether concentration in the air before and after passage through the adsorber was determined continually with a refractometer.[1] Clinically, a concentration of 1% in the outflow from the adsorber—indicating exhaustion of the activated charcoal—can be detected by the nose.

A suitable general arrangement for adsorber, valves and face-mask is set out in fig. 1. In order to divert the expired ether vapour, the breathing tube must have an expiratory valve as near the face-mask as possible. The face-mask carries a T-piece containing inspiratory and expiratory rubber flap valves. The expirations pass through a large-bore tube into the adsorber, where they are freed from ether vapour. The heat developed by the adsorption process is considerable. To prevent the adsorber from getting too hot, the distance between the interior of the activated charcoal layer and the adsorber-walls is kept small, and if possible the adsorber is surrounded with a water jacket. The charcoal container should be of the same material as the water container—e.g., brass—to prevent corrosion of the soldered joints. If the exhausted activated charcoal is to be regenerated by heat without removing it from the adsorber, all or most of the seams should be silver-soldered.

1. *J. Physiol.* 1942, **101**, 2P.

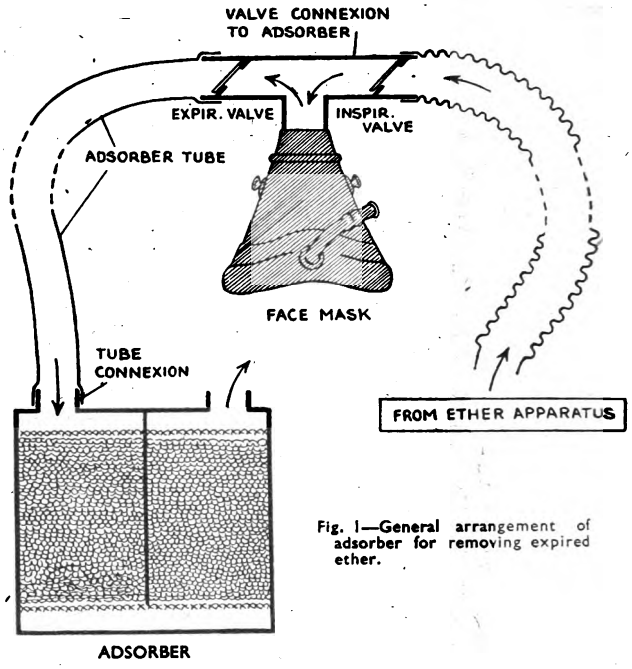

Fig. 1—General arrangement of adsorber for removing expired ether.

MEDIUM AND LARGE CAPACITY ADSORBERS

Two adsorbers have been evolved on the basis of numerous laboratory and clinical experiments.[2]

The medium-capacity adsorber in fig. 2 consists simply of a small container (*a*) of elliptical cross-section, filled with 600 g. of activated charcoal. A variety of activated charcoals for gas-adsorption have proved suitable; (among the various kinds used were: nutshell charcoals of medium activity and high activity from the Ministry of Supply; coconut charcoal from Messrs. Harrington Bros., granule size between 6 and 8 mesh). The resistance to breathing is appreciable, if the cross-section of the adsorber is not kept large. The compartment containing the charcoal is 16 cm. deep, with a cross-section of 60 sq. cm., and rests on a false bottom (*b*) made of fine-mesh metal gauze; (*c*) is a layer of surgical gauze which prevents charcoal-dust from being blown out into the room. The outlet (*d*) is closed by a screw-cap when the adsorber is not in use. The rubber tube coming from the expiratory valve (fig. 1) is pushed over (*e*).

The large-capacity adsorber shown in fig. 3 consists of three concentric cylinders (*a*, *h*, *e*). The cylindrical ring-space (*a*, *h*) contains 1350 g. activated charcoal in a layer of 17 cm. depth and 115 sq. cm. cross-section resting on a false bottom (*b*). The top of the layer is covered by a ring of wire gauze (*c*) with a circular opening below the outlet (*d*), into which a small ring (*i*) covered with wire-gauze is inserted after the activated charcoal has been filled in. The drainage screw (*k*) with washer serves for removing charcoal-dust and possibly condensed water. The lid (*g*) of the water container (*f*) carries short sleeves where tubes (*e*, *d*) pass through it; about 1·7 litres of water is poured in, high enough to communicate with the space (*e*, *h*).

On the average, the medium adsorber was used for 1 hr. 10 min. before traces of ether appeared in the outflow, while the corresponding time for the large adsorber was 2½ hr. The amount of ether administered to the patient before break-point is fairly constant—about 8 fl. oz. for the medium, and 18 fl. oz. for the large adsorber.

The connexion between face-mask and adsorber must be of large bore—certainly not less than 1·5 cm. internal diameter. The expiratory valve leading to the adsorber, in order to offer little resistance, should be of the rubber-flap variety. The usual spring-loaded expiratory valve found on anæsthetic machines cannot be used without modification. A suitable connexion can be improvised from two Oxford vaporiser valve units, as in fig. 4. The first unit is connected to the angle-piece of the face-mask

2. It is hoped to describe the results in more detail in a paper by Epstein and Cowan, to be published in another journal.

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as usual, but the spring-loaded expiratory valve is dismantled, and a tight-fitting piece of rubber tube secured over it. The second valve unit is connected as shown, with the expiratory valve screwed down. The anæsthetist should breathe through the arrangement before using it, to confirm that the valves open in the right direction.

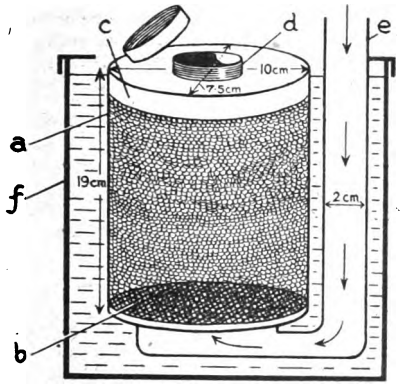

Fig. 2—Medium capacity adsorber.

Alternatively, a small compact connexion (fig. 5) can be made by soldering a third branch to a standard angle-piece; the inner bore of this third branch should be large enough to take an Oxford vaporiser flap valve unit, opening towards the adsorber. A breathing tube connects the adsorber to this third branch. The expiratory valve in the branch coming from the ether apparatus is kept closed.

The exhausted activated charcoal can be discarded, or can be returned occasionally to suppliers for regeneration. Regeneration can be done locally if an electric oven with temperature regulator is available. The waterjacket is removed from the adsorber, and the latter is then placed in the oven kept at about 140° C. One tube of the adsorber is connected to a pipe through which air is drawn at the rate of a few litres per minute by a water-suction pump or a central suction system. By this means an adsorber containing 3 lb. of activated charcoal will be regenerated within two to three hours.

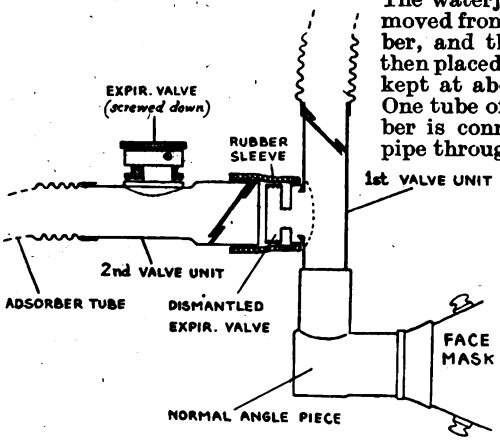

Fig. 4—Connexion between face-mask and adsorber tube, improvised from two Oxford Vaporiser valve units.

IMPROVISED ADSORBERS

Waters canister.—If no special adsorber or military respirator (see below) is available, a Waters canister can be used with certain precautions. To ensure that the expired gases go through the full depth of activated charcoal, the canister must be kept vertical, and the outlet at the bottom unobstructed; it should therefore be held vertical in a stand by a clamp. The resistance to expiration is higher than with the other adsorbers discussed in this paper. It can be reduced by interposing a thin-walled rubber bag (fig. 6) of about 2 litres capacity between the expiratory valve and the adsorber. Break-point of the Waters canister occurs after approximately 20 min., during which time 2–3 fl. oz. of ether will have been administered to the patient.

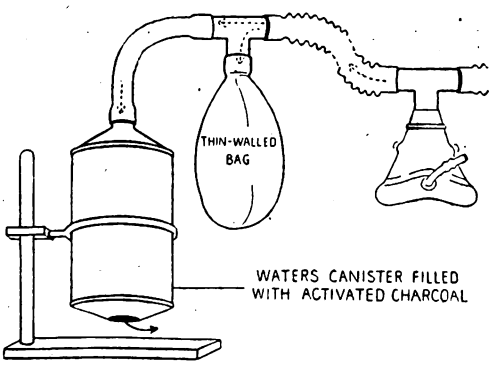

Fig. 6—Waters canister used as ether adsorber, with thin-walled rubber bag to reduce resistance to expiration.

Service respirators.—The charcoal containers of the two kinds of Service respirators now in use may be adapted for the same purpose.

Type E respirator container (fig. 7*a*) is an oblong, red-brown box, with a layer of activated charcoal together with dust filters inside. In the short metal tube on top of the container is a flap valve which must be removed when the respirator is used as an ether adsorber; this can be done easily with a hook made from fairly stout wire. This respirator container may be used for 17 min. before exhaustion occurs, during which time 2–3 fl. oz. of ether have usually been administered to the patient. This time may be shorter or longer by five minutes. After break-point some adsorption still continues—in fact, after 22 min. the activated charcoal is still removing half of the expired ether. The dust filter increases the resistance considerably, but it is not practicable to remove it from the container.

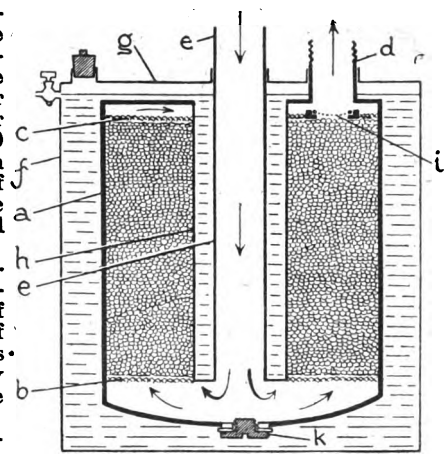

Fig. 3—Large capacity adsorber.

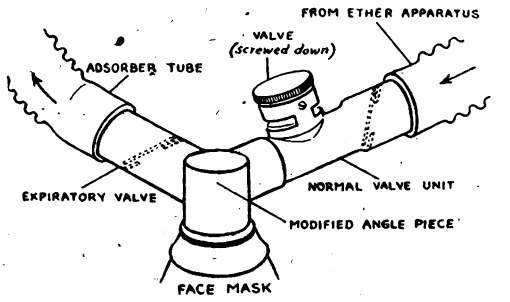

Fig. 5—Alternative connexion between face-mask and adsorber tube.

Light type, mark I, respirator container (fig. 7*b*) is smaller than the above, and consists of a grey, cylindrical box, with the dust filter as a separate structure; later patterns have no removable filters. Owing to the smaller amount of activated charcoal in it, break-point occurs on the average after 12 min. As in the larger respirator container, some time elapses after break-point before the activated charcoal is completely exhausted. In early models of this respirator container the breathing resistance can be considerably reduced by removing the dust filter part (fig. 7*c*). The light type respirator containers

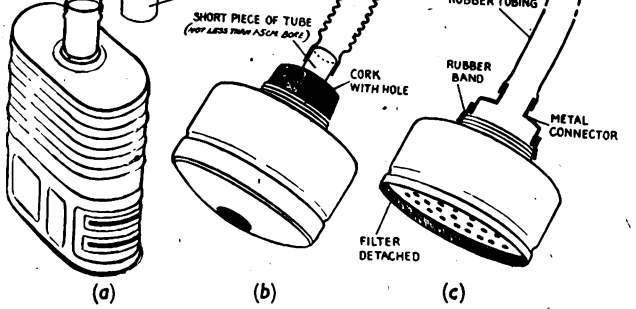

Fig. 7—Containers from Service respirators used as adsorbers. (*a*) Type E. (*b*) Light type, mark I, with filter, showing simple form of connexion with tubing from expiratory valve. (*c*) Early model of light type, mark I, with filter removed, showing more permanent connexion.

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require some connector before joining up to the tubing from the expiratory valve. A simple method of doing this is shown in fig. 7*b*. A cork is inserted a short way into the wide tubular end of the container; a piece of glass or metal tube is inserted into the hole in the cork, to take the rubber tubing of adequate inner bore. A more permanent fitting, which can be improvised from the lid of a tin-can (about 10 cm. diameter) and a short piece of metal tube, is shown in fig. 7*c*. A rubber sleeve joins the connector to the respirator.

I am indebted to the Chemical Defence Research Department, Ministry of Supply, for their help generally, and for supplies of activated charcoal and respirator containers; also to Dr. N. Saher and Dr. H. Rossiter, who tested several adsorbers in the operating-theatre.

SCIATICA

A STUDY OF 40 CASES

A. DAVID LE VAY, MS LOND, FRCS
LATE SURGEON, MINISTRY OF PENSIONS

INTEREST in sciatica has increased in recent years for two reasons: recognition of the prolapsed intervertebral disc as a frequent cause of symptoms, and the wastage from the Services for which the disease is responsible. In this account of a series of 40 cases, mainly young servicemen, particular attention was paid to the details of clinical examination and diagnosis. Inevitably, proper follow-up was impossible under war conditions, operative verification of disc-prolapse uncommon, and myelography or even lumbar puncture not always advisable. Nevertheless it was possible to relate the clinical features in those patients found to have a prolapsed disc at operation or myelography with those of the series as a whole. This paper deals only with the investigation of sciatic pain in otherwise healthy young adults, and though the possible causes are many—pelvic tumours, spinal metastases, &c.—they are uncommon in this age-group and distinguishable by their local features and florid progress; none in fact occurred.

EXAMINATION AND INVESTIGATION

Two preliminary observations may be made. First, examination must be thorough, and if lumbar puncture, procaine injection, &c., are included may occupy a couple of hours, a reason for segregation in special clinics where rapidity follows routine. Second, the clinician must be capable of grasping both the orthopædic and neurological implications of each case; this will be discussed later. A standard printed form was used for record purposes. A careful history included the patient's account of symptoms, occupations after leaving school, athletics and other strains, any significant trauma, rank and duties, and the natural history of the attacks which was often of diagnostic value. Paræsthesiæ and sphincter disturbance were also noted. These findings are given below; the frequency of recurrences and of combined low-back and sciatic pain will be observed.

HISTORY

Average age (years)	31½
Average duration of symptoms (months)	31

	Cases
Recurrent attacks (2 or more)	24
Significant trauma	15
Sudden onset	19
Subacute onset	21
Unilateral	35
Bilateral	5
Low-back pain + sciatic pain—	
Initial low-back pain	18
Initial sciatic pain	4 } 26
Simultaneous onset	4
Sciatic pain only	14

The *physical signs* fell into two groups: orthopædic and neurological. The former were nearly always very similar and included disorders of posture, gait, active and passive spinal movement, and the results of the straight-leg raising test, passive neck-flexion test, &c. Ober's and Ely's tests, and those described for sacro-iliac strain, were routinely applied but not found of value. The more important *orthopædic findings* were:

	Cases
Scoliosis—	
From affected side	21
To affected side	2 } 24
Alternating	1
Straight-leg raising limited	35
Stiff lumbar spine	30
Passive neck-flexion test positive	15

The neurological inquiry began with an assessment of mental attitude and morale. The main physical findings were wasting, altered tendon reflexes, weakness, changes of sensation and tenderness. In the following list of *neurological findings* only ankle-jerk changes are given, because alteration of the knee-jerk was not observed; weakness refers to the dorsiflexors and plantar-flexors of the foot. The examination ended with the Naffziger jugular compression test and lumbar puncture.

	Cases
Gross neurotic features	11
Paræsthesiæ	24
Ankle-jerk altered—	
Diminished	13 } 22
Absent	9
Weakness	21
Altered sensation—	
Hypoæsthesia	15 } 20
Hyperæsthesia	5
Naffziger test positive	11

The *cerebrospinal fluid* was examined in only 14 cases: protein was below 30 mg. per 100 c.cm. in 4, between 30 and 60 mg. in 5, and above 60 mg. in 5. No specimen showed the slightest increase of cells; the lymphocytosis said to accompany a radiculitis was not encountered.

Certain of these findings deserve comment. The common form of altered sensation was an analgesia and hypoæsthesia over the whole, or more usually the lower part, of the 5th lumbar dermatome. This segmental distribution was most clearly marked in the rarer instances of hyperæsthesia where an extensive area was clearly defined on the lateral aspect of the buttock, thigh and calf, extending almost to the iliac crest above and to the lateral aspect of the ankle and dorsum of the foot below. This area, which sometimes included the lateral toes, overlapped on to the anterior and posterior surfaces of the limb and was considered to be the complete 5th lumbar dermatome. In 2 cases the hyperæsthesia was so severe that pinprick could hardly be borne and the stimulus tended to be felt over a wide area; it is possible, therefore, that this was, in fact, a gross hypoæsthesia associated with an all-or-none type of reaction to stimulation. In 2 cases the sensory changes were over a wide strip running up the middle of the posterior aspect of the thigh and calf—i.e., the 1st or 1st and 2nd sacral dermatomes. Tenderness in the buttock, thigh and calf was of the referred deep type, corresponding roughly to the appropriate dermatome. In the buttock, apart from tenderness around the posterior superior spine, there was a common point in the upper anterior quadrant, especially in cases later shown to have a prolapsed disc. In the thigh the tenderness was clearly not of the sciatic nerve but of the deep structures as a whole, so that when it was posterolateral the nerve itself could be rolled quite painlessly. It is essential to look frequently and even daily for slight changes in the neurological signs or for their appearance when previously absent.

Radiographic examination included the usual views of the lumbar spine and pelvis with the patient erect as well as supine. In addition, erect postero-anterior views were taken in the extremes of sideways flexion, and oblique views for the articular facets. Note was made of congenital anomalies, scoliosis, loss of lordosis, local vertebral malalignment, width of disc-spaces, arthritis and evidence of vertebral disease.

RADIOGRAPHIC FINDINGS

	Cases
Congenital anomalies—	
Lumbarisation	1
Sacralisation	3
Spina bifida	2
6 lumbar vertebræ; spondylolysis	1 } 8
Spondylolisthesis	1
Myelography—	
Lumbosacral disc-prolapse	6
4–5th lumbar prolapse	1 } 8
Negative	1

The high incidence of congenital anomalies may only be interpreted as providing an asymmetry predisposing to lumbar and lumbosacral strain; in no case did they appear to be the direct cause of symptoms. Myelography was performed by several methods in numerous patients, many outside this series. Intrathecal and extrathecal iodised oil, intrathecal and extrathecal air were all tried, and until recently intrathecal iodised oil seemed the only reliable way of showing a filling defect. Latterly, however, experiences with combined intrathecal air and tomography were gratifying, the films being little inferior. This is a simple method, developed by Dr. C. W. C. Gough, in which 10–15 c.cm. of filtered air is

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used and several tomographic sections are taken in the coronal plane; it obviates long screening, and by providing successive sections in depth minimises the chance of missing a small submerged defect. Its place in investigation will be referred to later.

DISCUSSION OF FINDINGS

The cases fell into two groups determined by the presence or absence of neurological changes. These occurred in 28, the most important being weakness, altered sensation and decreased ankle-jerk. In 9 of these cases, in whom the whole triad was found, a prolapsed disc was demonstrated at operation or myelography; 7 were lumbosacral and 2 at L4–5. These were the only cases in which diagnosis was taken to the point of final verification of disc-prolapse, so that every fully investigated case with neurological features proved to have this lesion. While they exhibited these features fairly obviously, they were not otherwise selected from the main group, and the presence of these signs seems therefore to justify at least the presumptive diagnosis of ruptured intervertebral disc.

What of the group of patients without neurological features? It cannot be assumed that the diagnosis is excluded in these, because, on beginning the investigation, myelography or operation was felt to be justifiable only in the neurological cases of the series, and preferably in those with the triad of signs described. It does not follow, then, that these signs are essential, and in this light an analysis of the 12 non-neurological cases is of interest. The average duration of symptoms was only 22 months, compared to 34 months in the neurological group, while the percentage of recurrences was the same; and in the 4 cases in which lumbar puncture was done the c.s.f. protein was 50 mg. per 100 c.cm. or more. The history and orthopædic state, too, were very similar. It is suggested that these patients were at an earlier stage of clinical evolution, and if this is true it should be possible occasionally to observe the transition. In fact, in 3 cases originally without neurological features, these were observed to develop during a longish stay in hospital. This and the similar clinical history encourage the belief that the only real difference between the two groups is one of clinical progress.

The practical significance of this view is that disc-prolapse need not be ruled out in the absence of neurological changes when there are a suggestive history and orthopædic state. In such cases there may be a place for air-myelography and tomography to clinch a tentative diagnosis, and certain other features pointing to disc-prolapse will be particularly significant. They include sudden appearance and disappearance of the pain and two radiographic signs. Thus in one of the myelographic discs awaiting operation, complete relief of symptoms followed a snap in the back during exercise; operation was declined (case 4). The postero-anterior film of the lumbar spine may show tilting due to nuclear prolapse, producing malalignment of a pair of vertebral bodies (case 38); and films in the extremes of sideways flexion may demonstrate a failure of the sides of a pair of vertebral bodies to approximate normally when flexion is toward the side on which that intervertebral disc has protruded (case 15; L4–5; operative verification). Four discs were operated on, two after myelography, and five were proved by myelography alone; they exhibited the usual orthopædic features and the neurological signs have been touched on. Six had hypoæsthesia, two hyperæsthesia, and in one an initial hypoæsthesia changed into an intolerable hyperæsthesia under observation. The Naffziger test and the passive neck-flexion test were not sufficiently constant or well marked to justify description as essential parts of the syndrome of disc-prolapse.

DISPOSAL AND TREATMENT

The essential preliminary to disposal is the allocation of cases to their proper group. The neurological case must be regarded presumptively as having a prolapsed disc and treatment decided without myelography or much further investigation; of the remainder some may clearly appear to have a prolapsed disc also, and doubtful cases should be observed at rest in bed or in a plaster jacket. The length of observation and treatment should be governed by the patient's morale, for if sciatica is notoriously demoralising in civilians it is doubly so in Service cases. The influence of time on the development of deterioration is shown by the average duration being 46 months in the 11 neurotic patients and only 25 months in the remaining 29. The guiding principles must be early disposal and active rehabilitation from the outset by occupational and diversional therapy. In that majority of cases considered to have a prolapsed disc it must be remembered that the problem is as much orthopædic as neurosurgical. This lesion is not isolated, but only part of a continuing process of intervertebral strain; such a displacement cannot occur without disalignment of all the intervertebral articulations and stretching of many of the associated ligaments. While removal of the disc relieves sciatic pain, the back strain remains an actual or potential source of complaint which can only be radically treated by spinal fusion. This rules out of court, therefore, any operative procedure for Service patients save under exceptional circumstances—e.g., for a key man who must stay in the Service, for severe pain in men of good morale who can be downgraded, and for agonising pain unrelieved by any palliative measure. The relation between intervertebral strain and sciatica and the possible ill results of extensive procedures in Service cases are well epitomised in the account that follows.

CASE 16.—A soldier of 29, a baker in civil life. Seven years previously, owing to a machinery failure, he had to knead heavy dough manually while bent forward and felt a sudden pain in the small of the back and in the testicles. Ever since there had been recurrent low-back pain. On admission there were the clinical features of lumbosacral strain only, but after a few days numbness and hypoæsthesia developed down the back of the left thigh. A myelogram showed a lumbosacral filling defect amounting almost to a complete block and another defect at L4–5. In retrospect, proper assessment at this stage would have led to prompt invaliding; however, operation was performed, a very large prolapsed disc removed and spinal fusion carried out. In his plaster bed two days later the patient broke down mentally, the wound became infected and the grafts had to be removed. After prolonged healing this shattered man was discharged from the Army. The long history of lumbosacral strain preceding any signs of sciatica indicate that disc removal alone would have left him as much an orthopædic problem as ever; and the only operative procedure likely to cure him physically was too much for a man of poor fibre who should have been boarded soon after his first examination.

A reservation may be made about the disposal of disc cases if seen within 3 months of the first onset of symptoms, when a trial of immobilisation in a plaster jacket applied in head-suspension may be worth while; this often gives complete relief—a point of diagnostic value—and should continue for 10–12 weeks, followed by regrading.

Non-operative treatment may be discussed in some detail. Bed rest was found a most valuable (cynics may say the most valuable) form of treatment, and most cases responded save for a few who remained unrelieved until traction was applied to the legs with the foot of the bed raised, an invariably successful procedure. The provisos about bed rest are two: the patient must not be allowed to stagnate, and it should afford an opportunity for repeated examination to detect changes in, or the onset of, neurological features. Many cases were treated in a plaster jacket, and it is essential to waste no time continuing with this if pain recurs; an initial gratifying relief was often followed by recurrence due to change of posture within the plaster. It is doubtful whether physiotherapy has any place in the treatment of sciatic pain. Far too often patients were admitted after months had been wasted on heat and massage elsewhere, time better spent in immobilisation or definite disposal. Radiant heat may soothe but rest is disturbed by treatment, and no benefit follows the massage of hamstrings tender because of a lesion at the lumbosacral joint. The masseuse who "stretches the sciatic nerve" may or may not be so doing; it is the painful muscles and fasciæ that are put under tension and they are better left alone. Her true rôle—and explanation and discussion always lead to coöperation—lies in re-education of the long spinal muscles. Patients in plaster were given as rigorous a course of

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erector spinæ exercises as if they had had a fractured spine; their prognosis depends greatly on the efficient action of these muscles in guarding against further lumbar strain. Manipulation of the spine was performed in many cases with complete relief in 2, improvement in 2, and failure or exacerbation in the remainder. It may do as much harm as good, and, in view of the risk of paraplegia when there is a prolapsed disc, it was abandoned.

Local procaine injection was used freely throughout the series with disappointing results in spite of some initial prejudice in its favour. It never afforded complete relief though all accessible structures down to the ligamenta flava were explored. An essentially dramatic procedure, self-deception is only too easy without stringent checks. Often it is used as an adjunct to bed rest which may be the real cause of any improvement, and its true value should be assessed on the otherwise untreated ambulatory patient. The rapid injection of a large amount of strong solution into the back or buttock with a coarse needle may elicit the normal physiological pain reference, which, if sciatic in distribution, may persuade the observer that the root of the trouble has been reached. Finally, the areas injected are often the actual sites of referred pain, giving rise to confusion. Though it must be recorded that considerable improvement was noted in a few cases, some even shown later to have a prolapsed disc, on the whole focal muscular and ligamentous lesions were found of little significance in ætiology.

CONCLUSIONS

This investigation of 40 Service cases produced findings consonant with those of others on far more clinical material—e.g., that "most cases of ordinary sciatica are due to lesions of the intervertebral disc" (Pennybacker [1]), and that "prolapsed disc is by far the commonest cause of sciatica in Service patients" (Symonds [2]).

No evidence suggested that any of the patients were suffering from sciatic neuritis (or radiculitis), and it is difficult to see why this diagnosis should still be made for a group of clinical features so often shown to be due to a lesion whose existence is not hypothetical. A decision as to the probable existence of this lesion is the important step in disposal, a decision to be made on clinical grounds, of which the neurological features are a valuable but not an essential part.

It is submitted that a static view of the disease leads to failure to recognise the evolution of signs and symptoms; repeated examination is repaid by an increasing reduction of the unlabelled minority.

The opinions expressed in this article are purely personal, and are not to be taken as in any way representative of the views of the Ministry of Pensions or of any of the Services.

1. Pennybacker, J. *Lancet*, 1940, i, 771.
2. Symonds, C. P. *Proc. R. Soc. Med.* 1942, **35**, 511.

THERAPEUTIC RESEARCH CORPORATION.—The following officers have been elected for 1944: Mr. H. Jephcott (Glaxo) and Mr. F. H. Carr, D SC (BDH), chairman and deputy chairman of the board of directors; Mr. A. J. Ewins, FRS (May & Baker), and Mr. F. A. Robinson (Glaxo) chairman and deputy chairman of the research panel. Mr. Frank Hartley, PH D has been appointed secretary of the corporation, whose offices are now at General Buildings, 99, Aldwych, London, W.C.2.

POSTGRADUATE LECTURES AT EDINBURGH.—The following Honyman Gillespie lectures will be given during the spring at Edinburgh Royal Infirmary: Dr. C. P. Stewart, problems of communal feeding (Jan. 27); Dr. O. A. Trowell, liver function in health and disease (Feb. 3); Dr. William Blackwood, a pathologist looks at ischæmia (Feb. 17); Dr. Ian Aird, military surgery in geographical perspective—a Libyan exercise in surgical strategy and tactics (Feb. 24); Dr. E. C. Fahmy, abdominal pain during pregnancy (March 2); Prof. Stanley Davidson, the prevention and treatment of cholecystitis and cholelithiasis by diet and biliary antiseptics (March 16). The lectures which are open to graduates and senior students will take place at 4.30 PM.

LARGE TWINS

L. M. PARK, MB NZ, FRCS
OBSTETRIC AND GYNÆCOLOGICAL SURGEON TO SELLY OAK HOSPITAL, BIRMINGHAM

TWINS of a combined weight of 7000 g. (15½ lb.) are rare. The following case of binovular twins, combined weight 19 lb. 2 oz. (8705 g.), therefore seems worth reporting.

Mathieu,[1] who made a survey of published cases in 1938, found only 3 reports of twins of a combined weight of 15½ lb. (7000 g.) or more, and collected 17 additional cases; the highest combined weight in the series was 9180 g., apart from an uncorroborated observation sixty years ago to which he does not give credence. The heaviest infant was 4670 g., and the smallest 3400 g. Since Mathieu's article 3 further reports have appeared: DeLee and Greenhill[2] record twins with a combined weight of 7710 g.; Croft,[3] a combined weight of 7847 g.; and Wolf[4] a combined weight of 8250 g.

The weights of the male twins recorded here were 10 lb. 14 oz. (4956 g.) and 8 lb. 4 oz. (3749 g.).

CASE-HISTORY

A married woman of 30, height 5 ft. 2 in., made her first visit to Selly Oak Hospital on Oct. 29, 1941. Confinement was estimated to be due on Jan. 31, 1942.

She had had four previous pregnancies, and had been delivered of four living full-term infants: first child, now 8 years old, weighed 9 lb.; second, now 7 years old, 9¾ lb.; third, now 6 years old, 10 lb. (reported to be a long and tedious labour terminated by forceps extraction, and followed by confinement to bed for 7 weeks); fourth, now 4 years old, 10½ lb. (history suggested severe post-partum bleeding; she remained in bed for 5 weeks, and recovered slowly). The first child was delivered in hospital, and the other three in her own home.

On examination the large size of the uterus suggested a pregnancy of 34 weeks. Twins were diagnosed. Since she neglected to attend regularly, at the end of December she was urged by letter to visit the hospital, and was eventually admitted on Jan. 5, 1942, when she confessed she had been confined to bed for 3 weeks because she was unable to stand without assistance, and walking was out of the question. There was now œdema of feet and legs and lower abdominal wall, and she had some difficulty in breathing and in moving about in bed.

The fœtuses were lying longitudinally, a breech and cephalic presentation respectively. X-ray examination confirmed lie and presentation, and excluded any abnormality.

On Feb. 8 the membranes ruptured. Next day, 16 hours later, labour had not begun; the breech was high; there was no "taking up," and no dilatation of the cervix. In view of the character of her last two confinements, and the delay in the onset of labour, cæsarean section was decided upon, and the classical operation was performed the same day. The placenta of the first sac, weight 2 lb. 2 oz., was situated on the fundus, and the posterior wall, while the second placenta, weight 1 lb. 9 oz., also situated posteriorly, encroached considerably on the lower segment of the uterus. Uterine action was satisfactory, and at the completion of the operation the patient had lost altogether about one pint of blood. Bleeding was, however, excessive in the first three days of the puerperium, and an anæmia with 40% hæmoglobin was treated by blood-transfusion. The amount of liquor in each sac was not excessive.

Convalescence was uneventful, and she was discharged from hospital on March 9, when the respective weights of the infants were 12 lb. 4 oz. and 9 lb. 6 oz.

SUMMARY

Twins of a combined weight of 15½ lb. (7000 g.) or more are rare.

A case is recorded of twins with a combined weight of 19 lb. 2 oz. (8705 g.), the individual weights being 10 lb. 14 oz. (4956 g.) and 8 lb. 4 oz. (3749 g.).

The larger of these twins is the heaviest so far credibly reported.

1. Mathieu, A. *Northw. Med., Seattle*, 1938, **37**, 137.
2. DeLee, J. B. and Greenhill, J. F. Yearbook of Obstetrics and Gynecology, Chicago and London, 1938.
3. Croft, J. W. *Penn. med. J.* 1939, **42**, 758.
4. Wolf, W. *Geburtsh. Frauenheilk.* 1939, **1**, 570.

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Medical Societies

SOCIETY OF MEDICAL OFFICERS OF HEALTH

AT a meeting of the Fever Group on Dec. 17, with Dr. ANDREW TOPPING in the chair, a discussion on

Control of Respiratory Infections

was opened by Dr. R. B. BOURDILLON, who described methods used in the study of masks at the National Institute for Medical Research, and in particular a method for estimating the number of bacteria-carrying droplets escaping between the sides of a mask and the wearer's face. An average vigorous sneeze emits 100,000 bacteria-carrying particles, of which in still air about 4000 remain suspended for half an hour. Talking emits fewer particles, the number varying with different people. From three laboratory workers reading aloud the total number of infected particles collected per minute was 1500, 250 and 75. Of these about half were large enough to collect on open Petri plates.

Dr. JOYCE WRIGHT reported the results of an investigation into the control of dust-borne infection in measles wards. In a test ward, in which for 3 weeks the floor alone was oiled, the hæmolytic streptococcal content of the ward air during bed-making was but slightly less than that of a control ward. During this time, as indeed throughout the work, most of the aerial streptococci were type 6. Among the patients the cross-infection rate with type 6 streptococci was 58·1% in the test ward and 53·3% in the control ward; the middle-ear complication-rate, due to type 6 cross-infection was 18·4% in each. Since oiling the floor was evidently not sufficient to control cross-infection, further measures of dust control, by treating blankets, sheets, patients' garments, &c. with technical white oil were introduced into the test ward. During the subsequent 9 weeks the mean hæmolytic streptococcus count in the air of the test ward during bed-making was reduced by 97·5%. Compared with the control ward, the mean bacterial count in the air during bed-making and sweeping was 91% less in the test ward; and the mean hæmolytic streptococcus count was 98–99% less. Furthermore, the type 6 cross-infection rate was 18·6% in the test ward, while in the control ward it rose to 73·3%. The middle-ear complication-rate, due to type 6 cross-infection, was 2·8% in the test ward, compared with 14·3% in the control ward. The results suggest that dust is an important means by which streptococci spread in measles wards; that the oiling of bedclothes and floors reduces the infected dust in the air; and that the cross-infection and complication rates are thereby lowered. Attention should also be paid to the control of droplet spread, particularly by convalescent patients, and of contact spread by toys, books, baths, and the nasal toilet. All but a few of the patients in both wards received an intensive course of sulphonamides, usually sulphanilamide or sulphathiazole. The cross-infecting type 6 streptococcus was found by in vitro tests to be sulphonamide-resistant, and this may partly have accounted for its ready spread. Differing results with prophylactic sulphonamides in measles wards may possibly be explained by differences in sulphonamide susceptibility of the cross-infecting streptococci.

Dr. H. STANLEY BANKS, in discussing chemoprophylaxis of respiratory complications, said that the case-fatality rate of measles in the Park Hospital fell from 6·3% of 1290 cases in 1933–34 to 0·3% of 1625 cases in 1942 and 1943. There was a parallel but less pronounced fall in the incidence of bronchopneumonia, which was chiefly due to the almost total disappearance of bronchopneumonia developing after admission since the adoption in 1940 of a scheme of prophylaxis by sulphapyridine for 5 days from admission. Another apparent effect of this chemoprophylaxis was the fall in incidence of suppurative otitis media occurring after admission from 13·6% in 1933–34 to 3·8% in the closely corresponding epidemic of 1943. With few exceptions, the reduced number of cases of otitis media developed after the 9th day from admission—that is, after the chemoprophylaxis had ceased to operate—and was presumably due to ward cross-infections. To reduce these infections to the lowest level it is necessary to keep the period of isolation in open wards as short as possible in all uncomplicated cases—e.g., 12 days. Chemoprophylaxis might be extended for longer than 5 days, but this introduces certain difficulties. The situation seems considerably brighter when the effect of prompt and adequate chemotherapy of acute otitis media is taken into account. The best drug is sulphathiazole; the dosage must be high—as for severe infections—and the earlier it is started the better. A course of 9–10 days will cure about two-thirds of the cases, and most of the remainder can be cured by a second or even a third course applied without any break after the first. Occasional white-cell counts are necessary but young children tolerate the drug remarkably well. More than 90% of the cases recovered within 3 weeks. In the four years of this experiment there were only 4 mastoid operations, whereas in 1938 there were 19. By means of chemoprophylaxis, chemotherapy, sharp clinical supervision and short isolation periods, morbidity from streptococcal cross-infections could be kept very low even under present conditions in open wards. These are practicable measures. The general use of masks is impracticable, and such measures as oiling of blankets and floors have not yet been proved practicable. Dr. Wright's high figures of cross-infections referred only to the peak period of the epidemic and in other respects also were exceptional.

Dr. H. J. PARISH thought that spraying with aerosols would not control respiratory infections, since organisms might remain viable for 10–15 minutes, during which time infection could take place. He wondered, too, whether oiling of floors and blankets is necessary in modern fever hospitals with good bed spacing, adequate ventilation, &c. He had seen numerous barriers in use between beds but was doubtful of their efficiency.—Dr. BOURDILLON thought a short barrier opposite the patient's head an advantage provided the patient could be taught to cough or sneeze directly at it.

Dr. MAURICE MITMAN said that in combating aerial cross-infection it must be realised that hospital air and dust carry a bacterial load enormously in excess of that outside, and that almost all respiratory infections are intramural events. The bacterial load of a room depends on the rates of addition and removal of organisms; measures of control aim at influencing one or other of these rates. Methods of limiting the rate of addition include the avoidance of overcrowding, observance by individuals of the rules of hygiene, the application of modern architectural and engineering principles to ward construction, and the practice of fever ward management. The worst examples of overcrowding are to be found in public transport vehicles, and it is false national economy to allow the present overcrowding of trains in winter. Guarding the mouth and nose with a big handkerchief during sneezing and coughing should be a cardinal rule of hygiene; masks are merely an extension of this principle. Sneezing into the air should be interdicted as was spitting—a practice now almost eliminated. For propaganda purposes he suggested a cinema film contrasting the relatively innocuous but punishable offence of punching your fellow passenger on the nose with the dangerous but unindictable crime of sneezing into the air. Those in an infectious state should avoid crowded places and social calls. Dust traps must be avoided in ward construction and furnishing. Exposed engineering services in wards are wrong practice and no consideration of cost or convenience of maintenance make them right. Compare the engineering labour saved once in 10 years with the domestic labour expended daily in dusting. Ward management aims, among other things, at eliminating dust producers, of which the blanket is the worst example. Adequate consideration is seldom given to the close contacts between the patient, his discharges and his blankets. Medical superintendents should review their hospital's practice of dealing with blankets after use by a patient. He regarded oiling as an expedient and was convinced that the blankets, as an article of bedclothing in hospital wards, must go. Only in patients with tuberculosis has the danger of the pocket handkerchief been appreciated. Ward activities such as bedmaking and sweeping add enormously to the bacterial load. Of methods of removing bacteria, aerosols, ultraviolet radiation and air-conditioning are still experimental, but ventilation is an old and tried practice of the utmost importance in the elimination of intramural infection. Wells considers ventilation fair if there are 25–100 turnovers per hour, obtainable in mild weather

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with open windows. Less than 10 turnovers per hour constitute bad ventilation and is quite common in wartime if windows and doors are closed and air replacement depends on natural seepage. What Wells calls good ventilation (100–500 turnovers per hour) is impossible mechanically, but he maintains that by irradiating the upper air, using germicidal ultraviolet lamps, a purification equivalent to such a ventilation can be obtained.

Dr. WILLIAM GUNN had tried oiling floors and using aerosols and ultraviolet radiation for checking cross-infection with but partial success; there is probably a future for ultraviolet radiation but not until dust has been satisfactorily eliminated, for it protects the organisms from the lethal effects of radiation. Some system of ventilation providing for downward draught of air, instead of upward or lateral as used at present, would solve most of our difficulties. The cross-infection and complication rates recorded by Dr. Wright appeared high compared with hospital figures for other measles epidemics, but the experiment took place over a short period at the height of a severe epidemic when some overcrowding could not be avoided. In every material respect the routine in the two wards in the experiment was similar apart from oiling of floors and linen in the treated ward; cases with otitis on admission were included and nursed in the wards during their stay instead of being removed to isolation units as is commonly practised. There were no deaths among the treated and only one (ulcerative laryngitis and pneumonia) among the untreated, giving the favourable mortality of 0·2% among 494 cases in the combined groups, to which the intensive sulphonamide therapy employed doubtless contributed no small part.

In reply to a question Dr. BOURDILLON said that for hospital purposes with unlimited laundry facilities he favoured the gauze mask provided it was changed frequently. On the subject of ward ventilation he felt that very high rates of air exchange could not be tolerated by the older patients, who felt much too cold.

ROYAL ACADEMY OF MEDICINE IN IRELAND

PAPERS read at a meeting of the Section of Anatomy and Physiology on Nov. 20, 1943, included one by Prof. HENRY BARCROFT, Dr. O. G. EDHOLM, Dr. J. MCMICHAEL, and Dr. E. P. SHARPEY-SCHAFER on

Changes in the Circulation during Fainting

At the onset of fainting, they said, the heart slows and the blood-pressure falls steeply to a low level. Measurement of the cardiac output by the direct Fick method by McMichael and Sharpey-Schafer in 7 subjects showed that during fainting cardiac output is not further diminished and may increase. The fall of BP is therefore not of cardiac origin, but is due to vasodilatation. In an investigation of the effects of a controlled hæmorrhage of approximately ¾ litre, 3 subjects fainted while the forearm blood-flow was being recorded by the Lewis-Grant plethysmographic method (Barcroft and Edholm, *J. Physiol.* 1943, **102**, 5). In all of them the forearm flow increased during fainting. The combination of increased forearm flow and fall in BP signifies vasodilatation in the forearm during fainting. In view of the intense pallor of the skin the site of the vasodilatation is probably the skeletal muscle.

In other experiments the effect of sympathectomy was produced by anæsthetising the deep nerves to the forearm musculature (Barcroft, Bonnar, Edholm and Effron, *J. Physiol.* 1943, **102**, 21). There was a high initial blood-flow because all vasoconstrictor impulses were removed. During fainting the blood-flow fell steeply with the descent of the BP, and recovered as the BP rose. It was concluded that the fall of BP in fainting is due to a peripheral vasodilatation of muscle vessels, and that the dilatation is of nervous origin.

TYPHUS RESEARCH IN PALESTINE.—A laboratory for typhus research and control has been set up in Palestine by the Hebrew University and Hadassah (the American Women's Zionist organisation). Conducted by Prof. I. J. Kligler, head of the university department of bacteriology and hygiene, it will concern itself chiefly with methods of preventing the spread of the disease. Its establishment has been made possible by grants from the Hadassah Emergency Committee and the Palestine Endowment Funds (of the USA).

Reviews of Books

Care of Tuberculosis in the Home

JAMES MAXWELL, MD LOND, FRCP, assistant physician and demonstrator of practical medicine, St. Bartholomew's Hospital; physician, Royal Chest Hospital. (Hodder and Stoughton. Pp. 105. 7*s.* 6*d.*)

WRITTEN primarily for the patient, this book is a valuable résumé of the essential points about tuberculous disease and its repercussions on the patient's social environment. Dr. Maxwell recommends that each step in treatment should be explained clearly to the patient, who should learn to control his own life and keep a healthy attitude towards his disease. The chapters on the nature of tuberculosis, its symptoms and treatment are written with fine simplicity and only an author with real knowledge of his subject could have explained so clearly the controversial subjects of immunity and resistance to infection. The chapters on hygiene and prevention make good reading for medical and social workers as well as for patients and their families. There is sound advice on occupation, marriage and diet; the chapter on the return to freedom, dealing with the transition period between sanatorium and working life, is especially helpful. Dr. Maxwell recognises that it is the general practitioner who is in a position to suspect trouble in its earliest stages, to advise about social problems, and later to help the patient to return to his working life. This book should be a helpful guide to him.

Anopheles Gambiæ in Brazil 1930–40

FRED L. SOPER; D. BRUCE WILSON. (Rockefeller Foundation. Pp. 262.)

IN 1930 *Anopheles gambiæ* was introduced into Brazil from West Africa and produced one of the gravest threats that had ever menaced the future health of the Americas. Although warning voices were not slow to point this out and the mosquito itself gave an early indication of its fell potentialities, no sustained effort to eradicate it was made until after the cataclysm of 1938 when, in two states, more than 100,000 people had malaria and more than 15,000 died of it. The authors describe the mosquito and its habits, and discuss how it was introduced into Brazil. Fast destroyers ("avisos") carried both mail and mosquitoes the 3300 kilometres from Dakar to Natal, 150 miles north of Pernambuco, in less than a hundred hours. Having established a bridgehead at Natal the mosquito spread inland—with difficulty at first, owing to the terrain, but later with devastating effect when more favourable conditions were reached. An appeal to the federal government of Brazil led to the Rockefeller Foundation being called in, and early in 1939 the Malaria Service of the Northeast was set up. Surveys were followed by control measures, and within two years the infested regions were freed of the invader. It is a fascinating story of methods, illustrated by line drawings, photographs and tables, which may well serve as a model for any future campaign of a like nature.

Sexual Glands of the Male

O. S. LOWSLEY, MD, FACS; FRANK HINMAN, MD, FACS; D. R. SMITH, MD; ROBERT GUTIERREZ, MD. (Oxford University Press. Pp. 746. 55*s.*)

THIS important work deals with the embryology, anatomy, pathology, symptomatology and treatment of the genital tract. Dr. Lowsley writes of the prostate, Dr. Hinman of the testicle and epididymis, and Dr. Gutierrez of the vas deferens and seminal vesicle. The book maintains the high American standard of illustrations, and the text is the fullest record of the surgery of the genital tract yet published as a single volume. There are some gaps however. Impotence is dismissed in two paragraphs. It is stated that most sufferers from impotence usually have lesions in the genital tract; whereas most authorities teach that organic impotence is comparatively rare. Stricture of the vasa, or of the ejaculatory ducts, is said to be the commonest cause of sterility, which again is contrary to general clinical experience. Otherwise the book is a safe guide to the surgery of the genital tract.

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THE LANCET

LONDON: SATURDAY, JANUARY 22, 1944

PREVENTION OF GOITRE

IN an age which is becoming steadily more familiar with the names and nature of diseases, more conscious of its rights and duties in respect of health, there is one trenchant and wholly proper question which we shall be called upon to answer with increasing frequency: "If preventable, then why not prevented?" Hitherto the idea of prevention has been chiefly associated in men's minds with the contagious and infectious diseases. While it is now accepted that sensible standards of living and feeding encourage health in the individual and fortify him against illness it has been less widely and more slowly appreciated that there are also general standards of living and feeding, the ignorance, neglect or inaccessibility of which must favour the large-scale continuance of disease or disability within the community. The persistence of some of our major social diseases, even when their pathology has long been elucidated, has been mainly due to the complexity of their ætiology. Even when a specific agent has been isolated, as in tuberculosis, it may yet be found that other influences, such as poverty, malnutrition, overcrowding and bad working conditions, must be countered before the incidence of the disease is satisfactorily reduced. With the specific deficiency diseases (although these too have complex ætiologies) the addition, in foodstuffs or otherwise, of the vitamin or other factor which is in short supply may, even in the absence of other desirable improvements, diminish or abolish the disease. Rickets and scurvy in their more florid forms have now become rare in the British Isles because the necessary food supplements have been made available even where economic and environmental conditions remain adverse. Certain diseases due to deficiencies of mineral substances could be as readily removed. Iron-deficiency anæmia and simple goitre, both of which particularly affect women of the working classes during the most active and burdensome period of their lives, need not be allowed to continue in our midst. Their abolition could probably be well advanced within a single generation, and by simple and economical means.

Goitre should be easier to abolish even than anæmia. The necessary iodine must be provided at least throughout the reproductive cycle and the whole of childhood. In this issue the Goitre Subcommittee of the Medical Research Council has put forward some of the arguments for national prophylaxis in a paper which anticipates a fuller report. Before invoking public and official interest in a campaign for the adoption of iodised salt for domestic use throughout the country there are four questions which should, perhaps, be answered:

1. Is the prevalence of goitre sufficient to justify the machinery and expenditure necessary for the addition of traces of iodine (1 part of potassium iodide in 100,000) to the whole of the nation's table and cooking salt?
2. Alternatively, is there any reliable way of securing that iodised salt should be employed by those sections of the population which are particularly at risk?
3. Should the use of iodised salt become obligatory, or, with the aid of an elaborate educational campaign, be advocated on a voluntary basis?
4. Are there any incidental disadvantages which might be expected to accompany the use of iodised salt in the dilution suggested?

In the absence of morbidity figures for the non-notifiable diseases and of reliable clinical standards of diagnosis it is impossible to give even an approximate figure for the incidence of simple goitre in these islands. But, without taking into account the transitory thyroid enlargements of early life, it must be accepted that the disease remains a common one; it occurs sporadically throughout the country and with a much higher incidence along the "goitre belt" which runs from Cornwall to the north. Even though serious disability is relatively rare, goitre disfigures and inconveniences many thousands of women and a smaller number of men, and cretinism has not been abolished. War-time nutritional conditions, among them the continued shortage of fish, are conducive to an increased incidence of goitre. The population particularly at risk is scattered diffusely through the country, particularly in rural areas and among small communities which are least accessible to education and propaganda. If, as has proved possible during the war, a contribution to national health can be made by the compulsory employment of an approved standard flour for our daily bread—a measure which, though not universally enjoyed, has at least been generally accepted—it seems both possible and reasonable to attempt a further contribution to national health by adding to the salt a proportion of iodine so small that it could affect neither its savour nor its culinary use. In many districts and homes the additional iodine consumed would do no more than compensate for the deficient intake due to a low iodine content in food and drinking water. There is no good evidence from other countries that the minute quantity of iodine proposed has any deleterious effect either on a healthy person or on the owner of an established goitre, whether of simple or thyrotoxic type.

The arguments for national prophylaxis are therefore strong. We may indeed have been a little dilatory in not accepting them as set out so convincingly at the International Goitre Conference of 1927,[1] when WAGNER-JAUREGG (Vienna), MUGGIA (Sondrio) and SILBERSCHMIDT (Zürich), in the light of their existing experience, all commended general prophylaxis by means of iodised salt (KI, 1 in 200,000), and DE QUERVAIN greeted the proposal as a milestone in progress. If by iodising salt it proves possible to bring about a major reduction in the incidence of simple goitre, both endemic and sporadic, and if at the same time with the aid of such compounds as thiourea we can convert Graves's disease into a more benign and tractable malady, medicine—once more applying physiological and chemical knowledge—will have two new triumphs to record, and incidentally may write *finis* to a brilliant chapter in the history of special surgery.

1. *Lancet*, 1927, ii, 1240, and 1928, i, 345.

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HOSPITALS AND THEIR STAFFS

THERE is a lull in planning, but when very shortly the white-paper emerges from the travails of Whitehall there will be a fresh outburst of discussion. Meanwhile the critics whose concern is hospitals might whet their teeth on a report which appeared in Scotland last autumn. Some years ago the Scottish advisory committee of the Nuffield Provincial Hospitals Trust appointed 16 physicians, surgeons and medical administrators, from the chief towns of Scotland, to be its medical advisory committee. In 1941 this committee reported on the regionalisation of hospital services in Scotland, dividing the country into four main regions based on the university towns, and a fifth on Inverness, and pointing out the advantages of correlating all hospital services within each region. After another two years' study it offers its conclusions [1] on how the correlation should be brought about.

It is significant that the report does not begin with the question of administrative control, of how to yoke the voluntary and the local authority in double harness; for administration is a means to an end, and the end must be clearly seen before the means can be wisely designed. The end is that the hospitals, as part of the larger unity of the health services of the country, should provide for everyone who needs them the best and most appropriate treatment that medicine can offer. Alongside this the report sets the principle that in all schemes of development of medical services the needs of the sick person, rather than administrative or professional convenience, take first place. It is easy to pay lip-service to that principle, but harder to apply it when the clash of interests comes. Having stated the end in view, the report shows sound judgment of the fundamentals by proceeding at once to discuss the medical staffing of hospitals. Buildings and beds and equipment—apt always to bulk large in the administrative mind—are much less important than the men who work with them. It is those men (and women) who must be organised into a unity, not the impersonal "health services." That is the one essential difficulty that lies ahead and it is well brought out in our correspondence columns this week.

The past dis-organisation, of haphazard growth, is no longer efficient, sometimes not even effective; it must be superseded. The nearest model of a unified service is the Army, but most doctors are convinced that in long years of peace they could work neither well nor happily in a hospital service run on military lines. What is needed is a service, which, though coördinated, still leaves every member a maximum of freedom, of responsibility and of opportunity. However wisely it is designed, such a service will still depend for its success on the goodwill and conscientiousness of its members; but its design can do much to make it or everything to mar it, and in our view three features are essential.

1. It must be professionally democratic. That does not mean that it should be run by a parliament of medical politicians elected on the crude one-man-one-vote principle, but it means that in every hospital, large and small, the whole medical staff should feel responsibility for hospital policy and should have a voice in determining it. The Scottish report recommends that staff councils should be instituted in all hospitals, that their representatives should attend meetings of governing bodies, and that there should be regional staff councils with access to the regional directorates.

2. Appointments and promotions must be made aright. Close in-breeding within a single hospital is undesirable, but "posting" of medical men from one appointment to another by a remote higher authority having only paper knowledge of both appointment and appointee is still more unsatisfactory. Professional qualifications and experience must be judged by a professional body, not a lay one, and that body should have knowledge of the appointment as well as full information about the candidate. Since many appointments in an integrated service will be based on a key hospital of a region and include duties at one or more smaller hospitals as well, the Scottish report suggests that every staff appointment above the grade of senior residents should be made on the recommendation of a regional appointments board. This board would be appointed by the participating authorities, who would be finally responsible for accepting its recommendations, or referring them back; its members, however, would not be delegates but persons qualified by their experience to advise on appointments, and it would be predominantly medical. Such machinery would virtually abolish the existing autonomy, as regards appointments, of both voluntary hospitals and municipal services, and some hospitals might feel that the loyalty of their staffs to the hospital tradition would suffer. As a concession to that understandable feeling an appointments board might be wise to take the staff of a hospital into consultation before making a recommendation to fill a vacancy; for even if this amounted to little more than a courtesy it would make for the friendly cohesion of hospital staffs which is necessary for the best work.

3. It should be salaried. We cannot now avoid the conclusion that to be an honorary member of a hospital staff and to earn a living in private practice, competing with fellow members of that staff, involves a conflict of loyalties. In that conflict the hospital suffers, and partly because of that conflict the increasing new demands on hospital services have been met more by municipal than by voluntary hospitals. Moreover private practice seems likely to shrink, faster or slower, Beveridge or no Beveridge. The Scottish report recommends that, as an elastic transitional arrangement, some physicians and surgeons, and some assistant physicians and surgeons, be given part-time salaries and the right of private practice, while the remainder, and all lower-grade members, should be full-time and salaried. For most of the next generation the incentive of private fee-earning will be gone, and we must be careful that the alternative incentive of promotion according to merit is provided and safeguarded from abuse. This is an added reason why the method of making appointments should be carefully designed: every candidate ought to feel that he has been fairly judged, if not literally by his equals and peers, at least by an unbiased professional body, including some of his colleagues, that is in a position to know him and his work.

If these three conditions are fulfilled, the new structure will become in the long run a salaried service with a democratic system of internal government in all matters professional, including appointments and promotions. There is enough good will and enough genuine love of their task among medical men to make it work well, and there should be enough strength in its professional government to balance the purely administrative and the political forces concerned in its wider direction.

The report of the Scottish Committee deals with many other aspects of organisation within the region. It strongly urges the establishment of regional admission bureaux through which all hospital admissions would be arranged, except where medical urgency demands a direct approach to an individual hospital; each bureau, directed by a medical ad-

1. Nuffield Provincial Hospitals Trust. Interim report of the Medical Committee of the Scottish Advisory Committee. Secretary: Charles S. Gurnley, W.S., 10, Duke Street, Edinburgh, 1.

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ministrator, would furnish statistics, keep case-records in summary form, and operate the regional ambulance service. The committee, like Dr. MACWILLIAM in our issue of Jan. 1, deprecates the creation of new kinds of special hospitals; cancer, for example, is not a disease that is better diagnosed or better treated in a separate institution, but should be dealt with in a general hospital by those members of the staff whose experience bears upon the particular case. Fever hospitals may tend to remain separate, but there is nowadays no reason why patients with infectious fevers should not be nursed in separate blocks of general hospitals. The smaller district maternity hospitals and local authority maternity services should work in conjunction with the central maternity hospital of each region. Mental health clinics including a small number of beds should be established at general hospitals, and their staffs should collaborate with the general clinicians in both teaching and practice. Provision for treating orthopædic conditions and the rheumatic diseases should be developed in close association and on a regional basis, with key units in the large general hospitals and large units for long-term treatment in big hospitals in country surroundings. Tuberculosis should be coaxed back from its years of isolation into a close relation with medicine and surgery: the surgical treatment of pulmonary tuberculosis, for example, is but a part of thoracic surgery and belongs in a thoracic surgical unit. Laboratory services, fixed or mobile, should be available in all parts of a region and to every practitioner; to this end they must necessarily be all under central supervision. At every turn the same argument recurs, that within the region there must be an elastic close-knit coördinated service, unhampered by local authority boundaries, by special conditions of admission to individual hospitals, or by the financial status of the patient.

The words integration, correlation, coöperation, central direction, crop up so often that we grow tired of them, and the impatient worker may readily say, "Enough of this bureaucratic planning; give me my own show and let me get on with it." The answer to him has already been given: "the needs of the sick person, rather than administrative or professional convenience, take first place." The needs of the sick are endlessly variable; the resources of medicine are multifarious; and only a large adaptable sensitive smooth-running organisation will fit the one to the other in the largest number of cases. The problem arises out of the nature of disease and the growth of knowledge. Its solution should be a pleasanter and more exhilarating task than winning a war.

VENOUS PRESSURE

NO-ONE doubts the significance of congested veins in the neck in the patient with mitral stenosis, and the degree of such congestion is an important component of the picture of congestive heart-failure. But when we come to the clinical interpretation of actual estimations of venous pressure the present rather inchoate knowledge of the mechanism of heart-failure raises difficulties. In an established case of congestive heart-failure the venous pressure is definitely raised, but no rise may be detectable by present methods in the early stages of failure, and it is well recognised that in the terminal stages the venous pressure may be abnormally low. STARR and his colleagues [1] have suggested that the rise is not directly and predominantly due to failure of the right ventricle, because damaging the right ventricle in dogs failed to produce more than a minimal increase in peripheral venous pressure. They mention various mechanisms whereby the rise might be brought about—for instance, as a result of weakness of cardiac action and the consequent diminished circulation the bone-marrow is stimulated by oxygen lack and this in turn leads to the increase of blood-volume which is known to occur in heart-failure,[2] the veins thus becoming congested. MCMICHAEL [3] has found that in the earlier stages of congestive failure there is a well-marked fall in cardiac output without any rise in venous pressure, and that the pressure does not rise until a later stage when the cardiac output increases. In other words, the high venous pressure cannot be looked on as a passive phenomenon due to diminished cardiac output; in MCMICHAEL'S view it may be a compensatory mechanism, although the exact factors concerned still await elucidation. One possible factor is the effect of alterations in CO_2 on what YANDELL HENDERSON [4] has characteristically described as the "tonic booster pumps" in the skeletal muscles that "in health send the blood through the veins back to the heart, a factor in the circulation almost as important as the heart itself." There is thus a growing appreciation of the active, as opposed to the passive, rôle of the veins in the maintenance of an adequate circulation.

Indirect methods of measuring venous pressure are not reliable and the direct methods involve the introduction of a needle into a vein, a procedure which has many practical objections compared with the usual method of recording arterial pressure. Further, the normal venous pressure is relatively low (10 cm. of water), which means that slight variations are significant and that some attempt must be made to standardise the technique by keeping a constant relationship between the level of the arm and that of the right auricle. HENDERSON points out that where measurements of venous pressure are most valuable, as in shock, the venous pressure is immeasurably low. He therefore recommended [5] a method which measures the venous return rather than the venous pressure. The patient is inverted on a table tilted to an angle of 45°, and the volume of blood thus collected in the great veins near the heart (the preventricular reservoir of von Recklinghausen) can be estimated by measuring the height of the column of blood in the vein of an arm held vertically or lifted gradually until at a definite elevation part of the vein collapses. By this method HENDERSON and HAGGARD confirmed almost all the findings of LEONARD HILL [6] in the classic paper in which he first drew attention to the influence of gravity on the circulation. Useful information can be obtained by the methods of GAERTNER [7] and of LEWIS,[8]

1. Starr, I., Jeffers, W. A. and Meade, R. H. *Amer. Heart J.* 1943, **26**, 291.
2. Gibson, J. G. jun. and Evans, W. A. jun. *J. clin. Invest.* 1937, **16**, 851.
3. McMichael, J. *Quart. J. Med.* 1938, **7**, 331.
4. Henderson, Y. *Medicine*, 1943, **22**, 223.
5. Henderson, Y. and Haggard, H. W. *J. Pharmacol.* 1918, **11**, 189.
6. Hill, L. *J. Physiol.* 1895, **18**, 15.
7. *Münch. med. Wschr.* 1903, **50**, 2038.
8. Lewis, T. *Brit. med. J.* 1930, **i**, 849.

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the former measuring the height to which the previously pendant arm has to be raised before the veins on the back of the hand collapse, and the latter the vertical height to which the swollen external jugular veins extend above the sternum. Neither, however, is very precise, and for accurate results direct methods must be used. The simplest of these is that of TAYLOR, THOMAS and SCHLEITER,[9] in which the pressure is measured in an L-tube, of which the short limb fits into an intravenous needle and the long limb is graduated in centimetres. By this method the normal pressure in the antecubital vein ranges from 3 to 8 cm. of water. The most recent method of direct measurement is a "phlebomanometer"[10] which is easily carried in a compact case which fits into the doctor's bag.

Measurements of venous pressure help the clinician in following the course of right heart-failure, in differentiating ascites and hepatic enlargement of cardiac origin from those due to hepatic, renal or abdominal disease, and in differentiating between cyanosis and dyspnœa of cardiac and of pulmonary origin. Perhaps the two conditions in which the most characteristic changes in venous pressure are found are peripheral circulatory failure, where it is abnormally low, and chronic constrictive pericarditis, where it is abnormally high. Whether its estimation will help us to tell left from right heart-failure is still problematical, and there is no unanimity as to its value in deciding whether to bleed the patient with heart-failure.

Annotations

BREAST-FEEDING

WHAT can be done to encourage breast-feeding? This question was put to the health campaigns subcommittee of the Ministry of Health advisers on mothers and young children, and their report[11] discusses the incidence of breast-feeding and the reasons for failure, reviews the familiar arguments, and compares the propaganda and other methods available to raise the incidence. The subcommittee, which is an essentially lay body, though it has Dr. D. H. Geffen in the chair and includes Dr. Letitia Fairfield among its eight members, estimates that about 80% of babies leave hospital wholly breast-fed, and that 95% of babies born "on the district" are wholly breast-fed when the midwife leaves; at the end of three months the figures for both groups have fallen to about 50%, and after six months to 40%. In discussing reasons for failure, they maintain that too much insistence on preparation of the breasts may alarm and discourage the mother, and in hospitals breast-feeding tends to become regimented, over-scientific and unnatural. In some hospitals babies seemed to be weighed too often and given artificial feeds too readily. The better results outside than inside hospitals may therefore be partly put down to the process being treated at home in a more matter-of-fact way. The subcommittee were struck by the gap, often of some days, between discharge from hospital and the first visit of the health visitor. They were appalled by the lack of instruction to medical students on the difficulties a mother may experience in feeding and rearing her baby in the first months of life. When they came to consider the arguments which might be used in propaganda they encountered the familiar difficulty that preferences were supported by assertions rather than factual scientific evidence. They were however satisfied with the arguments that breast-feeding is cleaner and (once lactation is satisfactorily established) easier than artificial feeding, and that breast milk is the only food designed by nature for the human infant. They did not advocate the use of psychological arguments because there was no agreement on the emotional effects of breast-feeding. The subcommittee disapproved of the use in propaganda of medical arguments based on the survival of premature infants or those operated on for congenital deformities, or on comparisons between the liability of breast- and bottle-fed babies to scurvy, rickets and anæmia, on the grounds that pregnancy should be considered a normal process, unassociated with disease. They could get no firm support from dentists for the suggestion that breast-feeding favours a well-shaped mouth; or from obstetricians for the view that breast-feeding hastens uterine involution. The best medical arguments from the mother's point of view were, in their opinion, that breast-fed babies are less liable to digestive upsets, that their general nutrition is more satisfactory, and that they get fewer infections (gastro-intestinal or otherwise) during the first year. In support of the last argument—much the strongest of the lot—they do not mention the Chicago investigation by Grulee in 1934, though its findings must be largely applicable to conditions in this country at the present day. They were told of two epidemics of infantile diarrhœa in municipal hospitals where in some cases infection seemed to be spread by breast milk from a bottle, suggesting that it is sometimes the bottle itself which is infected. In making their recommendations, the subcommittee do not look on breast-feeding as a panacea—a large proportion of artificially fed children are thriving, and in the years in which breast-feeding is said to have declined there has been a steady fall in infant mortality. In maternity wards they advocate a more elastic routine, closer touch with pædiatricians, and due consideration before giving a baby any feed other than the breast. So that no mother shall be forced by economic necessity to wean her baby they urge that effect should be given as soon as possible to those parts of the Beveridge report dealing with maternity benefit, and they ask for more home-helps to ease the return of the mother to domestic responsibilities. They would prefer moderate broadcast, editorial and film publicity to a spectacular campaign; and they think that in addition to publicity an attack is needed on the root causes of failure.

THE ELUSIVE EMOLUMENT

Mr. Stephen Hodkinson in a letter to our columns last week noted that most female nurses are resident, and under the Rushcliffe scale receive emoluments valued at £100–200 a year which is not liable to income-tax. These nurses' emoluments are an uncertain quantity; the first Rushcliffe report says of them:

> "In voluntary hospitals the value put on emoluments is fixed for the different grades by the Federated Superannuation Scheme. As regards municipal hospitals, some local authorities have estimated, as the value of emoluments of resident staff for superannuation purposes, the actual cost to the authorities providing them; others have fixed the value at the approximate amount (naturally greater) that the nurse would have had to pay, if she had had to provide them for herself alone; others have taken a middle course. . . . We have standardised these values by fixing, for each category of nurse, what appeared to us to be a reasonable valuation of the emoluments in terms of cash. . ."

On the face of it, only the first method seems to be justifiable. But there are advantages (remote if not immediate) to the nurse in rating emoluments at more than they are worth: she must pay a bigger superannuation contribution yearly, but so must the hospital; and she gets a better pension at the end. For the resident nurse who is going to spend all her working years this is satisfactory. A nurse leaving after a few years, however, receives a salary reduced by pension contributions from

9. Taylor, F. A., Thomas, A. B. and Schleiter, H. G. *Proc. Soc. exp. Biol. N.Y.* 1930, **27**, 867.
10. Burch, G. E. and Winsor, T. *J. Amer. med. Ass.* 1943, **123**, 91.
11. *Rep publ. Hlth med. Subj., Lond.* No. 91. HMSO. Pp. 18. 4*d*.

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which she will not benefit and for which she is not usually reimbursed on leaving.

Some nurses are non-resident, either because that suits the convenience of the hospital or—rarely—because they have the option of living out. High valuation of emoluments would benefit such nurses if they received the full cash value as a living-out allowance. The Rushcliffe Committee have distinguished between the nurse who is non-resident because her hospital requires it, and the nurse who lives out from choice. In the case of the former they recommend that the hospital should find accommodation and pay the full cost, making no cash payment to the nurse. The nurse living out from choice should, in their view, receive "a cash allowance in lieu of the emoluments, subject to a deduction in respect of services provided by the hospital." An example will make this clear.

> A ward sister in a general hospital receives an annual cash salary of £130. If she is resident her emoluments are valued at £100 yearly, making the supposed cash value of her salary £230 tax-free. If she chooses to be non-resident a sum of £30 is deducted from the estimated value of her emoluments for services provided by the hospital, and the actual living-out allowance which she receives is £70, bringing her cash income to only £200, on which she must pay income-tax.

The services for which this large deduction is made are meals provided on duty, whatever their exact number, and use and laundering of uniform. The hospital case for reducing the living-out allowance to £70 can thus be justified to some extent on financial grounds. But in practice it means that the non-resident nurse has to accept a standard of living lower than that of her resident colleagues—considerably lower, because amenities can be provided more cheaply by a hospital catering for a large group than by a solitary nurse fending for herself. In effect, the nurse is strongly discouraged from living away from the hospital. Yet some of us believe that girls of the best type for the job will not be attracted into nursing until the qualified nurse has the opportunity to make a home of her own like other women. This can only be achieved by making the living-out allowance equal to or greater than the gross emoluments.

CHOLESTEROL AND ANÆSTHESIA

THE original Meyer-Overton theory that the action of anæsthetics depends on their lipoid solubility could not account for the action of all anæsthetic agents, but it had the effect of stimulating investigations. As a direct result a considerable amount of information was obtained pointing to the relation between lipoid solubility and anæsthetic action for certain types of drugs. In 1936, Starkenstein and Weden [1] discussed the effect of cholesterol on the activity of anæsthetic agents, and Foldes and Beecher [2] of Harvard now report on the potentiating effect of lipoids on ether or barbiturate anæsthetics as observed in rabbits and mice. They bring evidence to show that in mice the intraperitoneal injection of olive oil or of cholesterol potentiates the activity of ether. Such potentiation was not seen after injection of lecithin. In rabbits the intraperitoneal injection of cholesterol greatly prolonged the anæsthetic action of a given dose of ether; with olive oil the action was shorter lived. Since the solubilities of ether in cholesterol and lecithin are of the same order, some property other than simple solubility seems to be responsible for the potentiating action of cholesterol in these experiments. In rabbits the action of a barbiturate (in this case pentobarbital sodium) was potentiated only by cholesterol and not effected by olive oil or by lecithin. Thus the mode of action of the cholesterol may not be the same for ether as for barbiturate. Aird and Gurchot [3] tried to show that cholesterol decreases the permeability of cell membranes while lecithin increases it, but there is not sufficient evidence at present to substantiate this view. The Harvard paper draws attention to what might well be a profitable line of research, aiming at the elucidation of, first, the potentiating action of cholesterol, and secondly the mode of action of anæsthetics. It would also be interesting to know whether the potentiation occurs naturally when the blood cholesterol is high, as in pregnancy, nephrosis, diabetes or jaundice.

1. Starkenstein, E. and Weden, H. *Arch. exp. Path. Pharmakol.* 1936, **182**, 700.
2. Foldes, F. S. and Beecher, H. K. *J. Pharmacol.* 1943, **78**, 276.
3. Aird, R. B. and Gurchot, C. *Arch. Neurol. Psychiat.* 1932, **42**, 491.

FIBRINOGEN DEFICIENCY AND HÆMORRHAGE

CONGENITAL absence of fibrinogen from the blood has been reported less than 10 times, although the first case was described by Rabe and Salomon [1] 24 years ago; only one case has been described in England, by Macfarlane [2] in 1938. Hæmorrhage is usually present from birth, but it comes in episodes with long periods of complete freedom; all the time the blood remains completely incoagulable and no fibrinogen can be detected by the usual methods; the bleeding-time is often, but not always, prolonged, and the number of blood platelets is sometimes normal, sometimes about half normal. In addition to these cases there are patients with hæmorrhagic diathesis who have very low concentrations of fibrinogen in the blood. Normal figures are about 0·22–0·36 g. per 100 c.cm. of blood; these patients with "constitutional fibrinogenopenia" have concentrations of perhaps a tenth of this figure. Nearly all workers have suggested that the conditions are inherited, but, as Quick points out, the evidence is inadequate; as in other hereditary blood diseases, it will be necessary to examine many close relatives, when fibrinogenopenia may be found less uncommon than expected, especially since Risak and others have shown that a person with a fibrinogen concentration of only a tenth normal may have no overt hæmorrhage. There is a third group of so-called "acquired fibrinogenopenia." In the case reported by Jürgen and Trautwein [3] a man developed hæmorrhagic syndrome at the age of 52; his blood was incoagulable, no fibrinogen was present, bleeding-time was 30 min. and platelet-count normal; autopsy showed widespread destruction of bone-marrow by carcinomatous metastases.

Clinically, fibrinogenopenia simulates true hæmophilia, but the bleeding seems to be less severe as a rule and hæmarthrosis does not occur. Diagnosis is simple, since it is the only condition in which the blood remains permanently incoagulable, clotting-time and prothrombin-time are more than several hours, and no real clot forms. Quick describes two simple methods of testing for absence of fibrinogen in the plasma: (1) half saturation with sodium chloride or quarter saturation with ammonium sulphate will precipitate fibrinogen if present; (2) fibrinogen coagulates at 58° C., so if plasma is heated to 60° C. and remains clear, absence of fibrinogen can be deduced.

Allibone and Baar [4] have now described two cases in infants: one, a girl aged 12 days, had incoagulable blood, blood fibrinogen 0·11 g. per 100 c.cm. (about half normal), and platelets a fifth normal; the infant had had umbilical oozing since birth and died on the 15th day, autopsy showing cerebral hæmorrhages; there was no family history of hæmorrhage, the father and a subsequent second child had normal blood, the mother's fibrinogen and platelets were about half normal. The second case was a female infant aged 2 months who had biliary cirrhosis of the liver with mild hæmorrhages; her blood was incoagulable and the prothrombin-time was more than 30 min, no fibrinogen was found at all, though bleeding-time and platelet-count were normal; for treatment she was given a transfusion of 60 c.cm. of

1. Rabe, F. and Salomon, E. *Dtsch. Arch. klin. Med.* 1920, **132**, 240.
2. Macfarlane, R. *Lancet*, 1938, i, 309.
3. Jürgen, R. and Trautwein, H. *Dtsch. Arch. klin. Med.* 1930, **169**, 28.
4. Allibone, E. C. and Baar, H. S. *Arch. Dis. Childh.* 1943, **18**, 146

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maternal blood and 1 c.cm. of synthetic vitamin K; prothrombin-time and blood fibrinogen promptly returned to normal and no further change was observed in the remaining 3 months of her life; she died from liver failure. No-one is likely to quarrel with Allibone and Baar's classification of their second case as an example of acquired fibrinogenopenia, but the evidence for calling the first congenital fibrinogenopenia is surely very thin; it is more likely to qualify for the "doubtful" class. Nevertheless their cases have drawn attention to several points. Intensive propaganda must by now cause every practitioner to think of prothrombin deficiency when faced with infantile hæmorrhage and to give treatment with one of the numerous vitamin-K-type substances; but the prothrombin-time is never so prolonged as it is in these cases of fibrinogenopenia, and it is clear that the fibrinogen content of the blood should be checked in cases showing unusually long prothrombin-times. Treatment for fibrinogen deficiency is by blood-transfusion, and in view of the disappointing results reported with vitamin-K alone it is possible that insufficient attention has been paid to other factors.

Another point is the association of low platelet-counts with the hæmorrhagic episodes of the congenital cases; this has been reported sufficiently often to be significant and it seems likely that so long as the platelets are functioning normally hæmorrhages are unlikely. All this goes to show that the various factors concerned in the coagulation of the blood are interdependent, that deficiency of one will affect the proper working of others, and that when treatment of one deficiency does not seem to be working it is as well to remember that there are several possible causes of hæmorrhage in infants.

THE PLACE OF OUABAIN

German and French physicians have been strong believers in strophanthus for the treatment of heart disease; but in the English-speaking countries it is rarely used in preference to digitalis, and even less today than formerly. Briefly, the British view is that it has no action on the heart other than that produced by digitalis, and that oral administration is unsatisfactory because of variable absorption from the alimentary tract. It is admitted that cardiac effects can be obtained within a few minutes by intravenous injection; but the effect of intravenous digitalis is evident within about half an hour, and strophanthns would be preferable only where an extremely rapid action is required. Cases of such urgency are very rare, being almost limited to paroxysmal tachycardia with failure. Incidentally, intravenous strophanthus is contra-indicated if digitalis has been given within the previous fortnight.

Continental opinion, on the other hand, gives the strophanthins properties that make them superior to digitalis in several conditions. These have lately been set out by Chávez[1] especially in regard to ouabain (strophanthin G), a pure crystalline compound said not to require biological assay. The chief claim is that the effect of ouabain on contractility is greater than that of digitalis, and he brings forward animal experiments in support of this statement. It is also said to increase tone to a greater extent—though tone is a property of heart muscle whose existence has been denied—and vagal stimulation and depression of the conducting tissue of the myocardium is less than with digitalis. In practice the main indications for strophanthus according to Chávez are acute failure of the left side of the heart (paroxysmal cardiac dyspnœa) and chronic left heart-failure—conditions in which rhythm is nearly always normal and tachycardia usually moderate. It is not recommended for chronic failure with systemic congestion and normal rhythm, and in any case its use for more than about ten days is not advised; if further cardiac stimulation is then needed digitalis should be substituted.

1. Chávez, I. *Arch. int. Med.* 1943, **72**, 168.

Thus one who believes in the advantages of strophanthus finds only a small field for its application, with paroxysmal dyspnœa as perhaps the most important indication. For this condition the only rival remedy he admits is morphine, which in this country is generally relied on as safe and quickly effective.

REHABILITATION OF INDUSTRIAL WORKERS

Roffey Park, Horsham, is to be opened in the spring as a medical rehabilitation centre, for office and factory workers, with accommodation for 120. Lord Horder is chairman of the organising committee and the capital has been provided by a number of progressive employers. Maintenance costs will be borne by local authorities, and close contact will be maintained with industrial medical officers. At the centre daily physical training will be provided and patients will have occupational treatment in workshops and in the grounds. Special attention is being paid to diet, and the cafeteria and model kitchens will be in charge of a dietitian. Contact will be maintained with offices and factories to ensure that the working background is understood and that patients go back to the occupation for which they are physically and psychologically suited. The medical director is Dr. T. M. Ling, MRCP, former lecturer in forensic and industrial medicine at Bristol and psychiatrist in the EMS. Those members of the staff who are not recruited from industrial organisations will receive training in industry before starting work. Facilities for the postgraduate training of doctors, social workers, and nurses in industrial health will be available as soon as the centre is ready for use.

AFTER SEVEN YEARS

King Edward's Hospital Fund for London has received £300,000 from a trust established by Lord Nuffield in 1936 to improve economic conditions in "depressed" or "special" areas such as South Wales, Tyneside and Durham. In giving £2,000,000 to finance ameliorative undertakings in these regions where mass unemployment was at its worst, Lord Nuffield stipulated that any surplus remaining in the trustees' hands after seven years should be handed over to the King's Fund. Though the problem of the special areas has not been solved, it is in abeyance; the demands of war having abolished unemployment, the trustees (Sir Nigel Campbell, Lord Portal and Mr. Seebohm Rowntree) not only have a surplus to deliver now, but also expect to make further large payments from the proceeds of some of the hundred enterprises they have initiated or supported. At a time when the economic inhibitions of our rulers made them politically impotent, the trust was able to set an example by fertilising some of the resources that lay waiting; and today the London hospitals are once more gainers by the good will Lord Nuffield has so often shown them.

Dr. A. H. GALE will deliver the Milroy lectures to the Royal College of Physicians of London on Tuesday, Feb. 22, and Thursday, Feb. 24, at 4 PM. His subject is to be a century of changes in the mortality and incidence of the principal infections which cause death or disability in childhood.

REFRESHER COURSE FOR TOs.—A course in tuberculosis for tuberculosis officers and medical practitioners will be held in Liverpool from Monday to Friday, March 27–31. The course has been arranged by the Joint Tuberculosis Council and NAPT joint committee on education, in collaboration with the city public health department, and the University of Liverpool. Application to Dr. Harley Williams, Tavistock House North, London, W.C.1.

SOCIETY OF THORACIC SURGEONS OF GREAT BRITAIN AND IRELAND.—A meeting is to be held at 1, Wimpole Street, London, W.1, on Thursday, Feb. 10. At 9.30 AM there will be a discussion on carcinoma of the œsophagus and at 2 PM on lung abscess.

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Special Articles

PREVENTION OF SEASICKNESS BY DRUGS*

H. E. HOLLING, MB SHEFF, MRCP
SURGEON LIEUT.-COMMANDER RNVR

BRIAN MCARDLE, MD LOND, MRCP
RESEARCH FELLOW, NATIONAL HOSPITAL, QUEEN SQUARE, LONDON

W. R. TROTTER
DM OXFD, MRCP
CAPTAIN RAMC

THE work described here was undertaken with the object of finding a method of preventing seasickness in troops who are about to land on a hostile shore. In the Navy seasickness is overcome or minimised by adaptation to the motion of the sea; in Army personnel travelling to ports already in friendly hands there is ample opportunity for recovery from the effect of the voyage; but when a landing has to be made in the face of resistance it is easy to see that seasickness might on occasion become a handicap. The seriousness of the problem is probably not so great as might at first be thought, for landings on beaches are not likely to be attempted in a rough sea and in any case the experience of the Navy shows that the excitement of an action tends to banish seasickness. Nevertheless, it is possible that an unfortunate combination of circumstances might necessitate landing seasick troops. Under such conditions there might be some loss of efficiency. It therefore seemed worth while to attempt to find a means of prevention.

Numerous drugs are recommended for the prevention of seasickness. Such recommendations are usually based on somewhat unsubstantial theories, backed by clinical trials under conditions which did not permit of scientific control. The peace-time ship's surgeon is not in a position to treat his patients as experimental subjects. Consequently the only value of the numerous papers which have been published on seasickness is that they provide suggestions as to which drugs are worth a trial. The drugs suggested in this way seem to fall into two main groups: general sedatives and drugs of the belladonna group; in addition 'Benzedrine' (amphetamine) was recommended in the years before the war.

METHODS

In designing these experiments two variables had to be controlled or allowed for: the variability of the causal motion and the variability of the subject's susceptibility. The first might be overcome by a machine capable of reproducing the motion of the sea. An attempt was made to use a swing (to be described elsewhere) for this purpose. Although this swing successfully reproduced the symptoms of seasickness in a proportion of men, it did not enable one to predict with any exactitude which men would be sick on the sea. There was, therefore, no assurance that swing sickness is identical with seasickness, and this implied that any drug found to be successful on the swing would have to be tried again on the sea. For this reason it seemed to us that time would be saved by conducting all trials on the sea from the beginning. Variations in the degree of motion had to be accepted as inevitable, and allowed for by the provision of an approximately equal number of control subjects on all occasions. A further disadvantage which the inconstancy of the sea imposed was that it made comparisons between drugs difficult unless they had been used on the same trips. Finally, dependence on so fickle an element for experimental conditions imposed a considerable strain on the patience of the investigator. Chronic sufferers from seasickness may be astonished to learn that on most days throughout the year an obstinate and baffling calm haunts the waters round this island.

It was only possible to overcome the second difficulty—the great variations in individual susceptibility—by the use of sufficiently large numbers of subjects in treated and control groups, since it was not practicable to obtain the same men for repeated trials. If the treated and control groups were sufficiently large it would be justifiable to assume that each contained its fair share of men of every grade of susceptibility, from the immune to the most susceptible, and that the rate of sickness in the control group was therefore a good indication of what the rate of sickness would have been in the treated group, if no drug had been given. The effects of suggestion were counteracted in the subjects by the use of dummy tablets, and in the observers by leaving ashore the list which recorded which remedy each man had been given.

Accordingly, the following method was worked out and used in all the trials. Whenever there was a prospect of sufficiently rough weather a party of about 70 soldiers was embarked on two motor minesweepers or trawlers. One hour before embarkation each man received either a dummy tablet or one of the drugs being tested. Inspection of the mouth was carried out as a routine in order to discourage attempts to dispose of the tablets by other means than swallowing them. On each trip from 2 to 5 drugs were tested. In the earlier trips, the men were first divided into approximately equal groups, and each group was given either one of the drugs or a dummy tablet, each group being subsequently divided equally between the two ships. With this method of distribution, it seemed possible that groups of friends might receive the same drug and subsequently remain together in a part of the ship exposed to a greater or less degree of motion than the ship as a whole. This would influence the results and this practice was therefore discarded in favour of distributing drugs and dummy tablets in strict rotation.

The trips were of 2 to 6 hours' duration, the return to port being made when up to 40% of the men on board were affected. The men brought the usual Army haversack rations and ate them as soon as they got on board. They usually remained on deck and their movements were not restricted. One observer sailed in each ship. He noted the time of onset of rough water and of re-entering smooth water. During the trip he moved around the ship, talking to the men individually and observing the onset of symptoms. On returning to harbour every man was asked if he had had any symptoms; in this way occasional cases of vomiting or nausea which had gone undetected at the time were brought to light. Since the ships were small very few cases of sickness can have escaped observation.

On the whole the men enjoyed the trips. As far as could be judged from their remarks there was little apprehension of sickness before the trip started, and there were few instances of sickness unless the sea was at least moderately rough. In an explanatory talk before each trip the men were told that the object of the trip was to find which was the best of several seasickness remedies and it was also pointed out that the trip was to serve as an exercise in using their equipment at sea against a possible enemy air attack. The men's opinion of the remedies varied; some men thought that the pills had been given to them with the idea of making them more prone to sickness, and others that the remedies were very effective. It was interesting to note that some of the men believed firmly in the efficacy of the dummy tablets.

RESULTS

Table I shows the results obtained with all the drugs tested. As used in this table the term "sick" includes men who were nauseated as well as men who actually vomited. The diagnosis of nausea rested mainly on the man's own statement, but could often be confirmed by a glance at his face. On short trips such as these, nausea appears to be as incapacitating as vomiting; the fact that the majority of those nauseated had vomited by the end of the trip suggests that vomiting may be regarded as an incidental symptom likely to occur sooner or later in every nauseated subject. It is of course true that on long voyages vomiting is likely to become a disadvantage per se, on account of the loss of food and fluids and consequent exhaustion.

The final column in table I, headed "susceptibles protected %," is intended to be an estimate of the number whom the drug saved from sickness, expressed as a percentage of the total number who would have been sick if no drug had been given. Thus in the trips in which the effect of giving 0·6 mg. of hyoscine was determined 47% of the controls were sick, but only 20% of those treated with hyoscine. It has been assumed, therefore, that 27% (i.e., 47%−20%) of all the men

* This work was undertaken on behalf of the Medical Research Council with the collaboration of the Directors General of the three Medical Services.

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receiving hyoscine were protected, and that 57% (i.e., $\frac{47}{47} \times 100$) of those who would otherwise have been sick were afforded protection. The figures in this final column have been obtained by the formula :

$$\frac{(\%\text{ sick in control group}) - (\%\text{ sick in treated group})}{(\%\text{ sick in control group})} \times 100$$

This formula enables a rough comparison to be made between drugs used on different trips, but it must be remembered that such a comparison would be invalidated if it were shown that the efficacy of a drug (expressed as "susceptibles protected %") varied with the roughness of the sea (estimated by the percentage sick in the control group). These figures should be taken as an indication of the order of efficacy of the drug, rather than as an exact statement.

Some proprietary remedies.—Three of the more popular proprietary remedies (remedies A, B, C_1 and C_2 of table I) were chosen for investigation as being fairly representative of the large assortment available to the traveller. With two of the remedies (A and B) there was no significant difference between the sickness-rates in the treated and control groups, although the directions

TABLE I

Drug	Trips	No. of controls	Sick (%)	No. of treated	Sick (%)	Susceptibles protected (%)
Remedy A *	1–7	83	22	78	22	0
Remedy B *	1–7	83	22	75	25	0
Remedy C_1 *	1–10	141	34	129	16	53
Remedy C_2 *	13–17	86	38	91	37	3
Methedrine 8 mg.	1–7	83	22	77	22	0
Phenobarbitone gr. 1	6–10	84	39	78	32	18
Hexobarbitone gr. 10	4 & 5	18	61	14	64	0
Sodium hydantoinate 0·2 g.	27	16	38	14	35	8
d-Hyoscyamine 2 mg.	23 & 26	38	55	34	41	25
Homatropine 2 mg.	23 & 26	38	55	32	41	25
Atropine 1 mg.	13–17	86	38	88	23	40
l-Hyoscyamine 0·96 mg.	18–22	88	51	85	31	40
Hyoscine 0·6 mg.	13–23, and 26	212	47	218	20	57
Hyoscine 1·2 mg.	18–22	88	51	84	14	73

* Stated composition of proprietary remedies :—

Remedy A { Chlorbutol (chloretone) .. .. 0·52 g.; Caffeine .. .. 0·13 g.

Remedy B { Dimethyl propanalester of tropic acid 0·4 g.; Dioxydiethylpiperidine .. .. 0·2 g.

Remedy C_1 and C_2 { Hyoscyamine camph. .. .. 0·8 mg.; Hyoscine camph. .. .. .. 0·2 mg.; Sod. bicarb. .. .. .. 400·0 mg.

of the manufacturers were followed. The third proprietary remedy was found to be effective when first tested (C_1), but a second supply (C_2) from the makers was found to be without effect (table II). Biological tests on samples of this second batch suggested that its potency was less than indicated on the label, but it was not possible to carry out similar tests on samples from the first batch.

Miscellaneous drugs.—Other drugs found to be without appreciable effect were methedrine, 8 mg. (pharmacologically similar to 10 mg. benzedrine), sodium hydantoinate, 0·2 g., and the barbiturates hexobarbitone, gr. 10 and phenobarbitone, gr. 1.

In the present investigation the use of a drug was stopped as soon as it became evident that other drugs were more effective. In some cases, therefore, the number of subjects used was too few for a definite statement that the drug had no effect on seasickness.

Drugs of the belladonna group.—Atropine, hyoscyamine, and hyoscine were shown to have a significant effect on seasickness. All these drugs belong to the belladonna group. The figures given in table I suggest that hyoscine, even in the smaller dose used (0·6 mg.), caused a greater reduction in seasickness than did any other drug. Hyoscine (0·6 mg.) was used in the same series of trips as atropine and *l*-hyoscyamine, and a direct comparison of these drugs with hyoscine is therefore possible (table IIIA and B).

Though atropine and *l*-hyoscyamine seem to be less effective than hyoscine the difference is not statistically significant even if the combined figures for the two drugs are compared with those for hyoscine (0·6 mg.) on trips

TABLE II

Drug	Trips	Total men	Nauseated	Vomited	Total affected	Difference in % affected and standard error	Susceptibles protected (%)
Dummy tablets	1–10	141	8 (6%)	40 (28%)	48 (34%)		
Remedy C_1		129	5 (4%)	16 (12%	21(16%)	18 ±5·15	53
Dummy tablets	13–17	86	2 (2%)	31 (36%)	33 (38%)	..	..
Remedy C_2		91	2 (2%)	32 (35%)	34 (37%)	..	0

13–22 (difference = 6 ± 4·5). The larger dose of hyoscine (1·2 mg.) gave consistently better results than *l*-hyoscyamine on each of 5 trips (18–22) and the difference between the percentages affected is statistically significant (17 ± 6·4). Atropine, being used in different trips, cannot be directly compared.

It will be seen from table I that atropine (1·0 mg.) and *l*-hyoscyamine (0·96 mg.) appear to be of the same order of efficacy. It might be thought from this that, since 1·0 mg. of atropine contains only half this quantity of *l*-hyoscyamine, the other isomer (*d*-hyoscyamine) was exerting an effect. It is doubtful, however, whether the evidence will bear this interpretation since *l*-hyoscyamine and atropine were not used in the same trips. Moreover, some direct evidence on this point is available in that it was shown, although only in a small number of subjects, that *d*-hyoscyamine in doses of 2 mg. had no very striking effect (table IIIC). It is unlikely, therefore, that the 0·5 mg. of this substance, which was present in the dose of atropine used, could have had a detectable effect.

From table IV it will be seen that the effectiveness of hyoscine (0·6 mg.) as a seasickness remedy is firmly established. Table IIIA suggests that 1·2 mg. is even more effective than 0·6 mg., though the difference is not statistically significant (10 ± 5·9). Before recommending hyoscine as the most successful remedy of the series tried, however, it is necessary to consider the possibility of unwelcome side-effects.

Side-effects of hyoscine.—At sea the only unpleasant side-effect noticed with the use of the larger dose of hyoscine was the occasional complaint that dryness of the mouth made mastication difficult. The men were not drowsy and did not complain of eye symptoms. For military purposes, however, this was not considered adequate evidence of the absence of side-effects. Major

TABLE III

Drug	Trips	Total men	Nauseated	Vomited	Total affected	Difference in % affected and standard error	Susceptibles protected (%)
A							
Dummy tablets	18–22	88	5(6%)	40(45%)	45(51%)	..	..
Hyoscine (1·2 mg.)		84	3(4%)	9(10%)	12(14%)	37 ±6·6	73
Hyoscine (0·6 mg.)		88	6(7%)	15(17%)	21(24%)	27 ±7·0	53
l-Hyoscyamine (0·96 mg.)		85	3(4%)	23(27%)	26(31%)	20 ±7·3	39
B							
Dummy tablets	13–17	86	2(2%)	31(36%)	33(38%)	..	..
Atropine (1 mg.)		88	7(8%)	13(15%)	20(23%)	15 ±6·6	40
Hyoscine (0·6 mg.)		94	7(7%)	11(12%)	18(19%)	19 ±6·9	50
C							
Dummy tablets	23 & 26	38	2(5%)	19(50%)	21(55%)	..	..
Hyoscine (0·6 mg.)		35	0	5(14%)	5(14%)	41 ±10·0	75
d-Hyoscyamine (2·0 mg.)		34	1(3%)	13(38%)	14(41%)	14 ± 11·7	25
Homatropine (2·0 mg.)		32	3(10%	10(31%)	13(41%)	14 ± 11·9	25

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C. Wilson, RAMC, therefore, made observations on the effect of hyoscine and *l*-hyoscyamine on men carrying out a strenuous military exercise. His observations were made some two hours after the ingestion of the drugs in order that their effects should be at a maximum. He found that although hyoscine (1·2 mg.) and *l*-hyoscyamine (0·96 mg.) caused more unpleasant dryness of the mouth after severe exercise than appeared in control subjects, the drugs had no obvious effect on physical performance, ability to shoot, or on near vision. Our personal experience was that the mouth dryness caused by hyoscine (1·2 mg.) was unpleasant but preferable to seasickness, whereas the dryness caused by hyoscine (0·6 mg.) was only just detectable.

TABLE IV

Drug	Trips	Total men	Nauseated	Vomited	Total affected	Difference in % affected and standard error	Susceptibles protected (%)
Dummy tablets	13–23 & 26	212	9(4%)	90 (42·5%)	99 (46·5%)	..	..
Hyoscine (0·6 mg.)		218	13(6%)	31(14%)	44(20%)	26·5 ±4·4	57

It is evident from Major Wilson's experiment that hyoscine did not dangerously diminish sweating in men undergoing severe exertion in this country. In a small series of experiments in which two subjects took exercise in a hot chamber we found that the sweat output was somewhat less, and the rise in rectal temperature somewhat greater, when hyoscine (0·6 or 1·2 mg.) had been taken. The differences were, however, small and probably insufficient to be of practical importance. Our observations have since been repeated in Australia for the 0·6 mg. dose, with similar results. Hyoscine is therefore unlikely to have any deleterious effects, unless given to men on the borderline of heatstroke.

It must be pointed out that all our evidence on the unimportance of side-effects was derived from young male subjects, and has no reference to what might happen in the female, the very young, or the very old.

Repeated doses of hyoscine.—The evidence so far presented has been solely concerned with the effects of single doses of drugs in trips of 4–6 hours' duration. With the object of securing evidence of the effects of repeated doses of hyoscine and atropine during a longer period we made some observations during a voyage on a troopship. This experiment proved to be full of unexpected difficulties and no reliable evidence of the effectiveness of either drug was obtained. This experience showed, however, that, after an initial dose of 0·6 mg., hyoscine could be repeated in doses of 0·3 mg. at intervals of 6 hours for 48 hours without the appearance of obvious side-effects. Since there can be no doubt that hyoscine prevents seasickness in a proportion of men on short trips it seems reasonable to suppose that it would also be to some extent effective if given in this way on longer trips.

Further experiments.—In view of the unpleasant dryness of the mouth caused by hyoscine, it might be profitable to explore other related compounds in the hope of finding one which would be as effective against seasickness but which would not inhibit salivation. A start was made in this direction by testing homatropine and *d*-hyoscyamine. In the small doses used these drugs had only a doubtful effect on seasickness (table IIIC), but as considerably larger doses can be taken without discomfort it was hoped to make further trials. We also intended to try benzoyloscine and benzoyltropine, as both these atropine-like drugs are without much effect on salivation. Circumstances, however, prevented further investigations.

The search for more effective drugs would be greatly assisted if the mode of action of hyoscine in preventing seasickness could be discovered. The necessarily expedient nature of war-time research does not encourage investigations of this type.

SUMMARY

A number of drugs have been examined for their ability to prevent seasickness in troops. Hyoscine (0·6 mg. and 1·2 mg.) appears to be the most generally useful.

Our thanks are due to Dr. G. L. Brown and Dr. H. MacIntosh; to Mr. A. Bradford Hill, D SC, for his patient advice in statistical matters arising from this work; to the naval, military and air force authorities, and to the sailors and soldiers who with fortitude and cheerfulness gave us their indispensable help in this investigation.

MEDICINE AND THE LAW

Simultaneous or Consecutive?

To decide the devolution of property and the incidence of death duties a court is sometimes called upon to declare the order in which two or more persons, the victims of some common catastrophe, met their end. Were the deaths simultaneous or consecutive? Some eighty years ago Lord Cranworth observed that it was highly unlikely that two people died at exactly the same moment of time. That was in the days before high explosive rained down sudden death at random from the skies. He was thinking perhaps of shipwrecked survivors on a raft in mid ocean or of persons injured in a coaching or railway accident. The law demanded definite proof, not mere guesswork. The consequent uncertainty was shown to be inconvenient in Wing *v.* Angrave in 1862, where the court refused to accept any presumption of survivorship. To get over this difficulty a clause was included in the Birkenhead reforms of the law of property. Section 184 of the Act of 1925 enacts that, where two or more people die in circumstances rendering it uncertain which of them died first, then (subject to any order of the court) the deaths will, for all purposes affecting the title to property, be presumed to have occurred in order of seniority, the younger being deemed to have survived the older. The words "subject to any order of the court" were construed to mean that the court could receive evidence and act upon it in displacement of the new statutory presumption.

Last month the Court of Appeal took a non-technical view of deaths which had occurred in an air-raid; it refused to worry over split seconds. "Metaphysically speaking," said the Master of the Rolls, "time is infinitely divisible; but the law proceeds on a basis of common sense"—a reassuring statement. The case was *re* Grosvenor deceased. Two brothers, Dr. Randolph Grosvenor and Mr. Edward Grosvenor, were killed with other people when a bomb fell on a house in Chelsea in September, 1940. Dr. Grosvenor, the elder of the two, had left his estate to be divided among any of his brothers living at his death. The younger brother had left one third of his estate to Dr. Grosvenor. One brother, Mr. Robert Grosvenor, remained. It was necessary to decide at the outset whether the brothers Randolph and Edward died simultaneously, in which event Robert Grosvenor would be entitled to the whole of Dr. Grosvenor's estate. Mr. Justice Cohen, following a judgment by the late Mr. Justice Bennett in the Lindop case of 1942, held that, in the absence of proof, the statutory presumption must apply. Bennett, J., had used the phrase that time was infinitely divisible and had cited Lord Cranworth's dictum on the improbability of simultaneous death, even though there was medical evidence that the deaths of Mr. and Mrs. Lindop must have been simultaneous. Mr. Lindop was ten years older than his wife; they lived in the same room in a house in Torquay and lost their lives in the same air-raid in May, 1941, their bodies being found on the ground floor underneath their bedroom, suffering from multiple injuries. In the absence of exact proof the judge ruled that it must be presumed that the husband, being older, died "some brief moment" before his wife, in spite of the medical evidence that death from the blast would have been instantaneous. Now the Court of Appeal takes the "common sense" view which happens to coincide with the medical evidence. But it was a majority judgment of two lords justices to one; Lord Justice Luxmoore, in the minority, maintained that the circumstances of the deaths still furnished the element of uncertainty for which the statutory presumption was created to provide. Leave to appeal to the House of Lords has been granted; thus at last the attempt of Parliament to remove uncertainty will come

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to fruition. At present, although the law has decided that air-raid deaths are to be taken as simultaneous in the circumstances to which we have referred, the decision is that of two judges against three.

In England Now

A Running Commentary by Peripatetic Correspondents

ALL this planning in the medical journals has made me wonder just what I do want after the war. I qualified not long before the war began and volunteered after about two months of it. There must be thousands of young medical officers in a similar situation. I am grateful for the unique opportunity the war has offered for broadening my mind, but I deplore the fact that by the nature of my work I am divorced from interesting clinical material, and have become inadequate through lack of practice. What, therefore, do I want from a postwar world?

Having entered the war early I want to be demobilised among the first, and certainly before those of my contemporaries who waited until they had acquired higher qualifications before enlisting. This seems only common justice. The degrees these people hold and the Service hospital jobs which go with them should prove adequate compensation for the extended period of service. Once demobilised I want an equal chance of obtaining hospital jobs in competition with those others of my colleagues who did not go to the war, including the fresh young minds who graduated during the last few years. Those who allot such important jobs may look askance at the Service medical officer, especially if he has been in uniform for several years. They may prefer the man who has kept himself conversant with medicine. I would not ask for preferential treatment but I do ask that we who thought our patriotism had the most logical outlet in the Forces shall have equal standing in spite of our age and relative professional inexperience.

I want a job that is interesting—if I can prove worthy of holding it. I want to be able to pick my job—if I am competent to do it. I want to be able to change my job at reasonable notice—if I find it uncongenial. I want to be able to pick the district in which to work, a fundamental liberty which seems the sweeter after experience of an autocratic medical service. I don't want any of these things to depend on the good will of the local tinker, tailor or candlestick-maker, however much I may respect these worthies. I don't hold strong political views and I consider that active participation in government must of necessity be denied to the busy doctor. Similarly I would bitterly resent politics, local or general, invading my sphere except where such intervention is strictly necessary for the control of public money.

I have no private means and I want reasonable remuneration for my work—if I do it properly. I would like my income to rise because of my industry and skill rather than in proportion to the number of grey hairs on my head. I could take a greater pride in my work if I could see it—and the more tangible returns—growing under my hand. I would probably lose interest and faith if I were pegged down to a fixed salary and a predetermined yearly increment, and I am certainly human enough to be annoyed if some practitioner with less industry and fewer scruples than I should receive the same salary.

Particularly do I want to hold my head up in the community as a free man, answerable to no-one but my patients. I deplore the suggestion that my maximum salary should be fixed by law while prices rise and the incomes of my neighbours—the lawyers, the tradesmen and the business men—can be augmented as they wish and are decided by no third party. The lamentable failure of the Government to adjust the NHI capitation fee to an equitable amount makes me distrustful of suggestions that state-paid medical salaries would rise with the cost of living. I would like a measure of that respect paid to practitioners in the past, respect which would be scant enough if everyone thought that the local doctor was their paid servant, provided by a munificent Government to come and go at their bidding. I want to give my patients what I think the best treatment, even if new and expensive, without waiting for the ponderous machinery of the bureaucrats to give it a grudging blessing. If all experimentation is to be done under strict scientific control and only stereotyped methods allowed to the practitioner, then surely all incentive to improve will be lost.

If state control can be imposed while preserving most of these basic rights then surely we must wholeheartedly support it. We would all welcome bright and pleasant surroundings in which to work, with the bulk of the non-medical tasks taken off our hands. We would be enthusiastic over the wealth of diagnostic and hospital facilities which only public funds could provide in profusion. More time in which to examine and treat the individual patient, and more leisure for study and recreation would be only too acceptable. I think most of us would value guidance and instruction from some senior professional body whose duties were executive rather than advisory. Our respect for such a body would be enhanced if the members were elected more for their clinical and scientific abilities than for the colour of their coats. Equally I feel that we would intensely dislike orders from some lay Jack-in-office, or from a medical man who had been so long behind a desk as to be divorced from the realities of the profession.

* * *

It is high time we uncles, aunts, godparents and other siblings abolished that post-Christmas abomination, the thank-you letter. I calculate that my family wasted 10 hours of this Christmas holiday per man in futile composition. To you it may be a pleasure to dash off a few lines of thanks, but it is half an hour's work, and hard work too, for Bobbie or Richard (or me). That book, model aeroplane kit, book, model lorry kit, book or model engine kit may have given 20 minutes' enjoyment on Christmas morning, but I bet my boots it was responsible for a darned sight more than 20 minutes' boredom during the following week. For 20 minutes our popularity may have soared but for more than another 20 it slumped; and the slump came last. Yet if we can bring ourselves to forgo the amusement of Richard's spelling mistakes all we have to do next year is to say when we send our present, "With love from Uncle Gregory; no thank-you letter please," and the thing will be done. Those of us who are willing to go the whole hog like that deserve a little crest of our notepaper, with a crossed-out envelope in the middle and NTYLC (No Thank-You Letter Campaign) round about. Those whose business upbringing would give them agonies of suspense if their present was not acknowledged might enclose a reply-card on the cross-out-what-does-not-apply principle: "Thank you very much for the lovely/lousy present, which was just what I wanted/got last year. However did you guess? My brother/sister/father/mother has/have the 'flu. Best wishes for Epiphany. Love from . . ." Unless we do something of the kind we shall find our nephews, godchildren and what-not adopting alternative schemes, such as Richard's. He broke the back of the nuisance with the family typewriter on the first day of the holidays.

Dear *gap* (he wrote), Thank you for the *very long gap*. I had a lot of nice presens but yours was the best. Sorry the pictur on the back is roten it was done in a hurry. Love from Richard.

He typed this three times and made five carbons of each, so after Christmas he only had to write properly to a couple of very suspicious uncles and one very special aunt who had sent her sweet ration And I don't blame him; in fact to tell the truth I put the carbon paper in.

* * *

If you want to know what women have to put up with just let your wife and last remaining domestic go war-working. You'll find how little fun it is to wait half an hour for your turn to buy something which is no longer there when you reach the counter; to stand in the queue for a bus which is full when it arrives; or to prepare a meal when most of its ingredients are unobtainable. These are only a few of the annoyances through which the housewife must come smiling year in, year out. It's a wonder she ever smiles at all; in her place few men could manage it. And you have to tackle the housework yourself to appreciate the fire that won't burn, the brushes, dusters and other tools which are never where you put them, and the milk which doesn't come. We can but count the days till the Minister of Labour's Domestic Service (with capital letters, please) gets going.

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Reconstruction

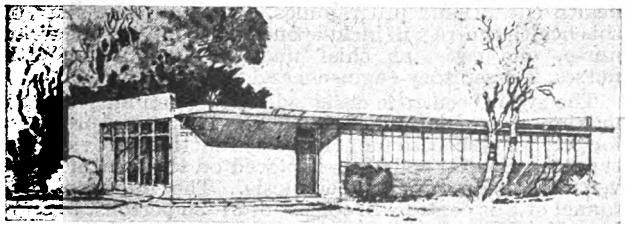
HEALTH CENTRES IN THE UNITED STATES

V. M. HOGE, MD JEFFERSON
CHIEF OF THE HOSPITAL FACILITIES SECTION, STATES RELATIONS DIVISION, US PUBLIC HEALTH SERVICE

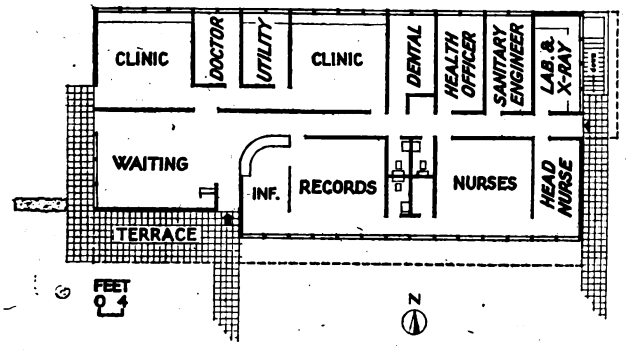
THE term "health centre" appears to involve quite different concepts in England and in the United States. Even in the United States, the term may be applied to structures differing widely in character. Thus buildings housing groups of private practitioners are sometimes referred to as health centres, and these seem to resemble the British concept fairly closely, but expressed in its simplest terms the typical American health centre is merely an instrument for the administration and practice of public health. Its chief significance lies in the fact that a facility specifically designed for the practice of public health is only now coming to be considered a necessity. The reason for this somewhat anomalous fact lies in the evolution of the science of public health.

PUBLIC HEALTH ORGANISATION

Official public-health measures are, of course, not new in the United States. They date back to the eighteenth century. While public-health organisation now follows the general political pattern of the country—i.e., federal, state, county and municipal—the earliest organisations were municipal and were created chiefly to control epidemics and maintain sanitary surroundings. It was only in the latter part of the nineteenth and the first part of the twentieth century that state departments of public



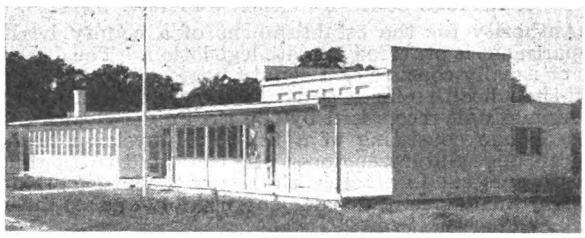
Type A Centre



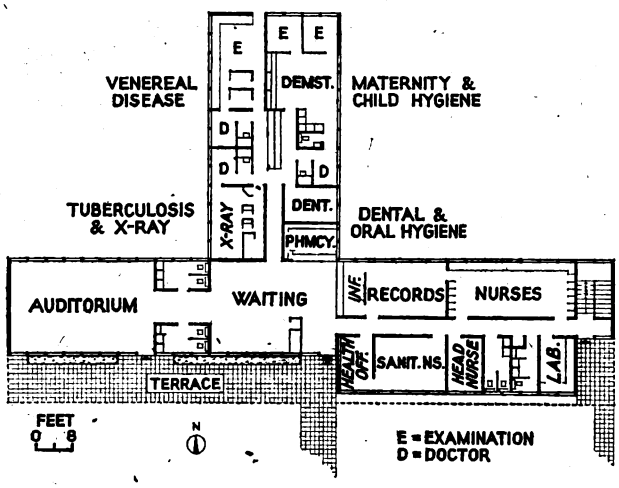
AHO = assistant health officer. D = doctor. Dem = demonstration-room. E = examination room. F = fluorescent screen. HO = health officer. HN = head nurse. INF = information. P = pneumothorax refill. PHM = pharmacy. SE = sanitary engineer.

health became common. Shortly thereafter county organisations appeared, operating under local authority delegated by the state legislatures.

The first county health department in the United States was organised in 1908. Others followed in rapid succession. At the present time every state has its department of health. Out of 3072 counties in the United States approximately two-thirds have some form of public-health organisation. The majority of these are single county units operating directly under the state organisation or more or less independently. Many counties, however, lack individual units and are grouped into health districts directly under the supervision of the state health departments. In addition to the state and county health departments, most municipalities retain their independent health organisations. Logically, however, the trend is now toward a unification of county and municipal health departments.



Type B1 Centre



In 1935, Congress enacted legislation known as the Federal Social Security Act. Titles V and VI of this act authorise annual federal appropriations for the promotion of public-health activities within the states.

The Social Security Act does not authorise the use of the funds for the provision of physical facilities. Therefore, while the technical advances in public health have been tremendous over the past few years, these advances have been materially handicapped by lack of modern accommodation. In many instances the housing of the local health department has been of minor concern to the community. Often this important function has been relegated to an abandoned schoolhouse or to some undesirable space in the county courthouse. In such inadequate quarters the health organisation is not an object of community pride but just another public function.

But there have been some noteworthy exceptions to the generally poor quality of public-health accommodation. In a number of our larger cities where public-health facilities are decentralised, some neighbourhood health centres have been constructed which are models of specialised design. A few health centres providing adequate, even generous, quarters for a comprehensive health programme have been provided by private foundations, such as those built by the Commonwealth Fund in Massachusetts, Mississippi and Tennessee. These exceptions, however, only serve to underline the general inade-

Type B2 Centre

quacy of the others. It took the upset of the present war with its increased health problems and the necessity for larger public-health staffs to bring home to the country the need for a modern functional health centre and an understanding of what such a centre really is.

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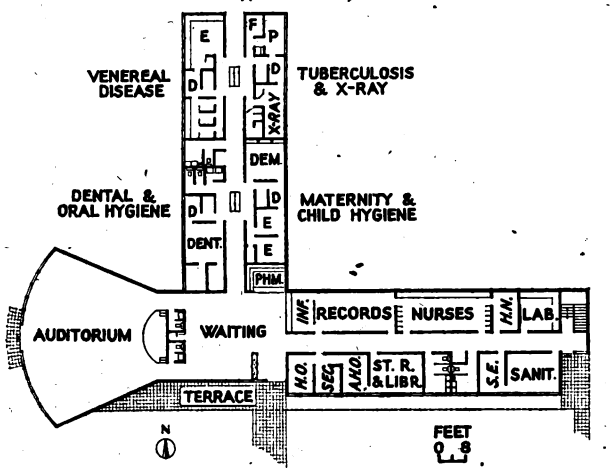
A TYPICAL COUNTY HEALTH SERVICES UNIT

Authority for the establishment of a county health department is provided in state legislation. The department usually consists of a county board of health and a full-time health officer and necessary assistants. The minimum unit recognised by the US Public Health Service is one consisting of a full-time physician health officer, one sanitary engineer, one clerk and two public-health nurses. In practice, the size of the health organisation, the degree of departmentalisation, and its duties

Type C Centre.



and functions will depend on a variety of factors such as the size of the community, available funds, special problems, &c. In the larger health departments, the organisation suggested by the Committee on Administrative Practice of the American Public Health Association is as follows:

I. Bureau of Administration.
  (1) Division of administration.
  (2) Division of public-health education.
II. Bureau of Vital Statistics and Records.
III. Bureau of Communicable Disease Control.
  (1) Division of epidemiology.
  (2) Division of tuberculosis.
  (3) Division of venereal diseases.
IV. Bureau of Maternal and Child Health.
  (1) Division of maternal, infant and preschool health.
  (2) Division of school health.
V. Bureau of Public-health Nursing.
VI. Bureau of Environmental Sanitation.
  (1) Division of public-health engineering.
  (2) Division of milk control.
  (3) Division of food control.
VII. Bureau of Laboratories.

Regardless of the size of the public-health department or its degree of organisation, its basic duties and functions in varying degrees remain the same. They are:

(*a*) Vital statistics
(*b*) Communicable disease control
(*c*) Venereal disease control
(*d*) Tuberculosis control
(*e*) Maternity hygiene
(*f*) Infant and preschool hygiene
(*g*) School hygiene
(*h*) Sanitation
(*i*) Food and milk control
(*j*) Public-health education

DESIGN OF HEALTH CENTRES *

It has long been obvious that the efficient performance of these technical functions requires specialised facilities. The health problems created by the war made it imperative that they be provided without further delay. Funds made available under the so-called Community Facilities Act (Public Law 137, 77th Congress) provided the means. The Hospital Facilities Section of the Public Health Service undertook to provide the plans. Four basic types were designed to serve communities ranging from 30,000 to 100,000 and accommodating health departments of from 8 to 35 persons.

The smallest of these health centres (Type A) is designed for a community with a maximum population of approximately 30,000. It is a one-story structure with a floor area of 2780 sq. feet. The clinic section contains two dual-purpose clinic rooms, a consulting-room, a utility room and a dental room. The laboratory space may also be used for X rays. The administrative section includes a waiting-room, information and record room, a nurses' room, and offices for the health officer, head nurse and sanitary engineer. The basement (not shown on plan) requires only partial excavation. It contains an assembly hall, a boiler and fuel room, maintenance room, storage space and a dual record room. For a community of the size to be served by a type A centre, the staff will consist of a health officer, a chief nurse, 4–5 public-health nurses, 1–2 sanitary engineers and a clerk.

Types B1 and B2 health centres are similar, except that B1 is of single-story construction and B2 has two stories. These are intended for communities with a maximum population of 60,000 persons. The clinic facilities provided are largely an elaboration of those in the smaller centre. In addition, this type provides an assembly and conference room, which is particularly valuable in public-health educational programmes. The full-time staff of this health centre will include one health officer, one chief nurse, one assistant chief nurse, 8–12 public-health nurses, 2–4 sanitary engineers and 2 clerks.

The type C centre is designed for a community with a maximum population of 100,000. This type provides for further elaboration of the basic functions provided in type A. Special emphasis is placed on the treatment of venereal disease and tuberculosis. The full-time personnel of this centre will consist of 31–35 persons, including a health officer, an assistant health officer, a chief nurse, 2–3 assistant chief nurses, 18 public-health nurses, 5–7 sanitary engineers and 3–4 clerks.

These four types are in no sense the last word in health-centre development. In fact, it was intended that deviations should be made wherever necessary to meet local problems and the needs of local public-health programmes.

It is clear that the American practice of public health and the design of the physical facilities for this practice emphasise the preventive side of medicine; the curative aspects are mainly incidental to the preventive programme. It may be predicted with assurance that the health-centre concept, now well established, will spread rapidly.

* Details of these centres can be obtained from the Hospital Facilities Section, US Public Health Service, Washington, DC.

VINEGAR FOR BURNS

LAST year Dr. Kathleen Aylwin-Gibson wrote of the value of malt vinegar in the treatment of burns (*Lancet*, 1943, ii, 144). Mr. Henry Sarson draws our attention to an eighteenth century account of the method which appeared in the *Gentleman's Magazine* (1794, **44**, 638) by "Mr. David Cleghorn, brewer of Edinburgh." The use of vinegar is described in "three letters to John Hunter, Esq., FRS, Surgeon General to the Army and by him to Dr. Simmons." John Hunter evidently thought well enough of the method to allow his name to be associated with it in a leading journal of the day. Dr. Simmons was possibly Dr. Samuel Foart Simmons, physician to George III. Vinegar is an old household remedy as the lines on Jack and Jill indicate. Its popularity, however, has declined since Mr. Cleghorn's day judging by A. W. Wilkinson's contemporary investigation of burns and scalds in children (*Brit. med. J.* Jan. 8, p. 37). Of 242 burned children receiving 316 varieties of domestic first-aid only one had vinegar applied. Wilkinson deprecates the use of all household remedies for burns: his advice is to get the patient quickly to hospital, and he found that those whose injuries had been covered with a dry cloth were in a better state on admission than those who had been given more elaborate care.

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Letters to the Editor

DOCTORS IN MUNICIPAL HOSPITALS

SIR,—As a deputy medical superintendent of ten years' standing in municipal hospitals, now temporarily employed in another service, the ideas I have formed may appeal to those interested in postwar medicine.

I think that in the past an important—if not the most important—branch of some municipal hospital services has not been sufficiently encouraged or developed; I mean the medical staff. If a hospital has a keen, competent, hard-working, coöperative medical staff it has got three-quarters of the way to maximum efficiency; the rest will follow, and the remainder of the staff will become proportionately efficient. State or municipal hospitals could and should attract such a staff of all grades.

After this war there will be a number of medical officers, not all young, released from HM Services, and available for civilian appointments. For a few years it will be easy to obtain first-class experienced staffs for hospitals. The service which intends to get, and keep, a first-class reputation must be determined not only to retain its medical officers, but also to see that a steady stream of recruits of the right type is maintained. Those entering must be convinced that they have joined a good service in which they can make their careers. The right type are likely to be so convinced more by the realisation that they have opportunities for improving their knowledge, maintaining a high standard of medical work, and associating with senior officers who will give them a sound professional opinion, than by salary alone. In organising a hospital service the following special considerations should, I suggest, be borne in mind.

Administration.—(*a*) The senior administrative staff should not only have experience of hospital administration, but should also be able and ready to say "No," if that is their genuine opinion, and to obtain the confidence and respect of their juniors. (*b*) An effort should be made to minimise the control of medical officers' personal problems or conditions by laymen, such as stewards, senior clerks, and politicians. Such control is liable to cause unnecessary petty irritations. (*c*) If it is thought advisable—as it well may be—to employ lay supervisors or administrators, they should be enlisted from those with recognised qualifications obtained outside the service, such as solicitors or chartered accountants. Their responsibilities should be clearly defined.

Accommodation.—The living conditions of medical officers need improvement, with provision either of suitable married quarters at the hospitals, or automatic permission and allowance to live out. I regard this as important because medical officers who have been in HM Forces and who have lived in a mess for some time will wish to return to some sort of home life other than that commonly offered to house officers.

Promotion.—The system of appointments should aim at selecting doctors for promotion according to their known ability and reputation in the service rather than on their "gift of speech," their personal appearance, and the impression given by a short interview to laymen whose judgment in the past seems to have been sometimes at fault. In selecting candidates for hospital appointments consideration should also be given to their ability to fit in with the staff, and for this reason the senior medical officers at the hospital should have a major say in the appointment.

Liaison.—There should be close liaison between the senior administrative staff and the clinicians working in the hospitals. This would improve mutual confidence and enable the senior officers to know the capacity of individual officers for hard, competent work and their ability to lead or control their juniors.

Transfers.—It might be possible to limit the time an officer remains continuously in any one hospital. If staff are periodically moved at the end of say two years, this adds interest to their careers and reduces the liability to apathy. For senior officers whose work was entirely satisfactory a longer period might be allowed if they did not desire a move. Opportunity should also be given for temporary transfer to special hospitals and to postgraduate schools, which would enable clinicians to enlarge their experience, and give them a wider appreciation of the working of the service as a whole.

Locum tenents.—An effort should be made to abolish the employment of locum tenents on a large scale, especially to fill responsible positions such as resident surgeon or physician. A large enough staff should be carried to provide responsible emergency officers; and by promoting more senior officers to the positions of additional medical superintendent, physician, or surgeon, as the case may be, paying them the salary of this appointment they could be utilised as reliefs. Their compensation, besides salary, would be that they would get varied experience, and would know that provided their work was satisfactory they would be the next on the list for a permanent appointment.

I visualise a large service with administrative appointments, its own postgraduate school, and general and special hospitals. Such a service should offer a young medical officer a career in which he or she would start as a house officer at the postgraduate school and later be transferred to a position which appeared to be suitable. During the first 3–5 years' service automatic transfer for temporary duty in a fever hospital, a tuberculosis sanatorium, and a mental hospital would be compulsory. After this probationary period he or she could specialise in administration, medicine, surgery or any of the special branches, according to aptitude and ability. Officers would thus have the opportunity to rise to a senior administrative position, to any of the teaching or research appointments in the postgraduate school, or to a specialist post in a general or special hospital. By reason of the transfers in their careers, officers would have at least a nodding acquaintance with the organisation and difficulties of other departments; and in view of the numerous contacts that they would make their success or failure would not be in the hands of only one or two senior officers.

T. ST. M. NORRIS.

PERFORATED PEPTIC ULCER

SIR,—In your issue of Jan. 1 Surgeon Rear-Admiral Wakeley has reawakened interest in the claim that perforation tends to cure a peptic ulcer. On the basis of his study of the after-histories of Naval patients operated upon for peptic ulcer, he puts forward the plea that the present attitude of medical boards in rejecting recruits with a history of perforated ulcer could well be modified. His results, both operative and postoperative, are certainly excellent, and his conclusions legitimate in relation to a select body of young fit men, well disciplined, contented, and belonging to a service famous for its esprit de corps. But are they applicable to men from civil life, often debilitated from long hours in factories, who will still have to make the difficult adjustment to service conditions?

In a follow-up of my own cases of perforated ulcer (*Glasg. med. J.* 1936, **125**, 109), only 30% of the patients admitted freedom from symptoms, and the most part of these had been operated on within the previous two years; 70% had recurrence of symptoms after perforation; in 40% the symptoms were severe. I have no grounds for believing that my results have been better in the difficult years since 1936. While the outlook for the patient who has recovered from perforation may be a little more hopeful than in those whose ulcers have not perforated, I do not think there is a case for departing from the present realistic attitude of medical boards towards the ulcer problem.

From the standpoint of surgical management Mr. Wakeley gives some wise counsel. A patient with perforation may be operated upon too early just as easily as too late. The delay of two or three hours to recover from shock is essential, and I have lost a patient admitted to hospital within an hour, from failure to observe this precaution. The reduction in operative mortality within recent years is, I believe, fairly general throughout the country. In the last 4 years I have had only 3 deaths in 61 cases, a mortality of just under 5%, as against 11% of 72 cases published in 1936. I attributed my improved results of the past four years to the use of sulphanilamide 10–15 g. intraperitoneally in every case, until I found them not substantially superior to those of my senior hospital colleagues who never employed it. My impression is however that it has saved some late cases. Several cases have shown jaundice after 15 g; 10 g. should be sufficient. Postoperative lung complications have not been fewer, and sickness is more pronounced. Wound sepsis has diminished, but I have the impression that wounds heal less promptly and oftener with collections of

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serum. One patient perforated for the second time within a week of closure; I think the toxic concentration of sulphanilamide locally interfered with the normal fibroblastic response.

In Mr. Wakeley's series the incidence of duodenal and gastric ulcer is almost equal. In the North, duodenal ulcer outnumbers gastric ulcer by 10 or 12 to 1. Is this difference geographical, or is it because we tend here to class all ulcers in the pyloric region as duodenal? Experienced radiologists agree that non-malignant prepyloric ulcers are very rare, so that even when the perforation is just on the gastric side the ulcer is still probably of duodenal origin. If the difference in distribution is real, then we have a problem whose solution must shed some light on the ætiology of peptic ulcer.

Victoria Infirmary, Glasgow. ROBERT MAILER.

RESECTION OF ŒSOPHAGUS

SIR,—Mr. Steele is to be congratulated on his resection of the lower end of the œsophagus and cardia for carcinoma, reported in your issue of Dec. 25. As a matter of historical accuracy, it should, I think, be mentioned that his is not the first recorded case in this country. At the October meeting of the RSM clinical section Mr. Vernon Thompson showed a patient on whom he had operated in October, 1941 (*Proc. R. Soc. Med.* Dec. 1943). As Prof. Grey Turner said on this occasion, it was worthy of remark that five successful cases of resection of the œsophagus for carcinoma were shown in one room on one afternoon.

Harley Street, W.1 R. C. BROCK.

COMMON SENSE IN ANÆSTHETICS

SIR,—Dr. Mallinson's claims appear to have conjured up a veritable convulsion in the ether camp, and readers unacquainted with current anæsthetic literature and policies must feel rather bewildered by the force of rhetoric (much of it heated and some frankly vituperative) which has burst about his ears.

For some time past a particular group of anæsthetists, of which Dr. Mallinson is an enthusiastic representative, has renounced the use of the older anæsthetics (chloroform, ether, &c.) which they roundly condemn as "old-fashioned and toxic." In their place intravenous, rectal or spinal anæsthetics, nitrous oxide and cyclopropane or combinations of any of these agents are employed on any and every surgical occasion. They even urge that the teaching of the technique associated with the older anæsthetics should be discontinued so that in time their use may die out. From time to time elaborate claims are put forward for these methods, among them that chest complications—even in abdominal surgery—are greatly reduced in incidence. Dr. Mallinson's article on Dec. 11 last is the latest incident in this incoördinated propaganda campaign.

Extremes beget extremes and it is little wonder that these views should encounter bitter opposition. The occasional anæsthetist who has little time in which to learn newer methods, and the type of specialist anæsthetist who by disposition is unprogressive or academically indolent, only too often dismiss such opinions out of hand as heresy. Yet these convictions are quite honestly held and should they be proved wrong (after objective investigation), surely they can be dismissed without unpleasantness. The "new-dealers" have at least drawn attention to the indifference with which postoperative vomiting is regarded by most surgeons and many anæsthetists. No doubt it is ideally desirable that all anæsthetics should be given by a specialist anæsthetist, but we must face the fact that at present, and no doubt for some time to come, many are not so given and will not be. Taken by and large, ether has a wider safety margin than any other agent, and consequently, despite its obvious disadvantages, has become the stock-in-trade of the occasional anæsthetist. Is he then, when in embryo, no longer to be taught its use? It is my own opinion that ether stands not the slightest chance of being displaced until the occasional anæsthetist goes; in this respect the exponents of the new-deal in anæsthetics appear to be tilting at windmills.

From the specialist's standpoint many of us consider that ether still has a place in anæsthetics, albeit a progressively diminishing place, its chief disability being related to the unhappy after-effects during the recovery period. All anæsthetic agents have their peculiar faults however, and few of them have anywhere near as wide a safety margin as ether, least of all perhaps 'Pentothal,' the technique of which should be courted with care and continually treated with respect. We are, I think, all getting tired of the constant market-cries that this or that drug is the only "safe" anæsthetic. No anæsthetic is safe—if it were it could be administered by a hospital domestic, and where, O where would the anæsthetist be then?

King's College Hospital. A. H. GALLEY.

SIR,—Students are required to give twenty anæsthetics, and this is all they seem to have time for; so how can we make the best use of these precious administrations in order to turn out a good jobbing anæsthetist from quite raw material? What are the best methods to teach? My own selection would be these:

1. For the first five cases, an open method—CE or ether, because it can be given anywhere with a minimum of apparatus, the signs can be easily demonstrated, and, most important, it teaches the student to watch his patient and not a machine.
2. For the next ten cases, the continuous flow gas machine, using, after induction, gas and ether with liberal oxygen, the gas acting mainly as a vehicle for the ether and as a basal anæsthetic. Five of these cases I would precede with an intravenous induction by a barbiturate; and while five of them were completed with the facepiece, with the other five I would, as the surgery permitted, show the student how to adapt the method for use with a covered pharyngeal airway and side-tube. He might even get the chance to link up with the Davis gag for a tonsil case, and so bring down two birds at once by anæsthetising the surgeon as well!
3. The remaining five cases would be used to teach the student how to handle a child, and to anæsthetise children with ethyl chloride on an open mask, followed by ether.

All very reactionary, no doubt, but I see no object, during such a limited course, in trying to teach more advanced methods and technique. A "whiff" of instruction in intratracheals (the endoscope can be almost as dangerous as a tommy-gun), gas and oxygen with its narrow margin and different signs, continuous 'Pentothal,' and the like, will only lead the beginner into trouble later on. These are better left to the experienced anæsthetist, and if the tyro has a flair for the specialty he will come back to learn them afterwards on his own.

In my opinion a programme on these lines is the best one for a student. Yet I realise there is another side to it—our duty to the patient on whom our student is going to learn. If he has to have an operation, say, for removal of a cartilage, and is given gas and oxygen properly, maybe he will sit up and enjoy his tea; on the other hand, if he is given CE or gas and ether—well, maybe he won't.

It seems to me that there is a problem here. What does the Brains Trust say?

Stanmore. ARTHUR SUNDERLAND.

SULPHONAMIDE DERMATITIS

SIR,—In your issue of Jan. 8 Tate and Klorfajn report that "out of a total of 2280 admissions [over a period of six months] to the skin department of a military general hospital, 55 were cases of sulphonamide dermatitis produced by local application of these drugs." No mention is made, however, of the total number of cases treated in this way, from which these 55 were drawn. I cannot help but feel that it must have been a very large number, for in the past 4½ months as casualty officer in a busy outpatient department, I have used sulphanilamide (as a powder, and made up in 2½% and 5% concentrations in zinc oxide cream) as a local application in over 400 cases of superficial wounds, burns, abrasions, impetigo, infected scabies, and varicose ulcers. The period of application has been from 3 to 14 days, and in some chronic cases (e.g., varicose ulcers and injuries with extensive skin loss) up to 8 weeks, and I have not yet seen one patient become sensitised with the production of a sulphonamide dermatitis.

We have not stopped using this group of drugs internally because of the occurrence of a granulopenia in a few cases and death in some of these. Skin rashes have

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also been seen to follow internal sulphonamide therapy—but still we use it. So why should Tate and Klorfajn end their article with the rather sweeping statement that: "Topical sulphonamide therapy for skin diseases and minor injuries is unjustifiable and should be discontinued"?

On p. 59 of the same issue an annotation on the sulphonamide-urea mixture ends with the remark that its use is not to be recommended. Provided that it is applied only to the area of infection under treatment and that it does not come into contact with the nearby healthy tissues I have found a 1 : 1 mixture of these substances very useful, especially in treating carbuncles. Separation of the slough seems to be hastened, and the time for healing shortened, compared with other methods of treatment, with the exception perhaps of short-wave therapy.

And, finally, I noted (p. 58) that, despite the present outburst against local sulphonamide therapy, the new National War Formulary will contain sulphanilamide in the form of a powder, and a 10% unguentum sulphanilamidi for local application. The latter is, perhaps, rather extravagant, since a zinc oxide cream containing 5% sulphanilamide seems to be adequate for most conditions where its use is indicated.

London, N.W.6. PHILIP HOPKINS.

WOUND ANTISEPTICS

SIR,—In your excellent leading article on antiseptics in the *Lancet* of Jan. 15 you refer again to the use of proflavine powder in the treatment of septic wounds. This was first advocated by Mitchell and Buttle (*Lancet*, Oct. 10, 1942, p. 416). Although a long interval has elapsed there has been a strange lack of writings in support of this treatment. I found that proflavine powder applied to an open wound caused extreme pain and sloughing. The end state of the wound was worse than before treatment. So bad was the reaction that I have not given the method an extensive trial.

The recommendation of McIntosh and Selbie to use 1% proflavine in sulphathiazole powder is not very attractive from considerations of physical chemistry. No antiseptic can act unless it is in solution. The proflavine powder must dissolve in the tissue fluids before the drug becomes operative. Clearly there will be a saturated solution formed when the solid drug comes in contact with the wound surface, whether it constitutes $\frac{1}{100}$ or $\frac{1}{1000}$ of the powder introduced. The only difference will be that between the particles of proflavine the wound surface will be subjected to a lesser concentration of the drug. Where the particles are the caustic action will be as great as when pure proflavine powder is used.

Is it not significant that Mitchell and Buttle (*Ibid*, Jan. 8, 1944, p. 66) should abandon the use of simple powdered proflavine to make a trial of a diluted powder? Have they had any cause to revise the view expressed in their first paper that no interference in heating takes place?

It is curious, how, in clinical problems, we are apt to forget the elementary facts of chemistry and physics, and regard the vague and often uncontrolled results of clinical experiments as possessing an exactitude comparable with those two sciences.

Basingstoke. CHARLES A. PANNETT.

THE FUTURE OF NURSING

SIR,—It is gratifying to find so much space allotted to the two latest sections of the Horder report on Nursing Reconstruction and your favourable comment on them. The suggestion, however, that the committee is in any way complacent about the "rigid segregation" from which nursing has suffered is, I hope, not justified. The committee is keenly alive to this shortcoming, but the fact that many matters have been left for consideration in its final section—on the social and economic aspects of the profession—has, perhaps, tended to obscure this.

No good purpose would be served by ignoring the fact that nursing is a 24-hour service, and that the nurse will never have as many free evenings as members of other professions. Once this is recognised, it remains to make the best of inherent limitations (*a*) by improving conditions of work through negotiating machinery, with special reference to the planning of more imaginative and acceptable time-tables and less rigid discipline when the nurse is off duty; (*b*) by encouraging a broader outlook among nurses themselves.

While recommendations with regard to (*a*) will be dealt with in the subsequent section, factors coming under (*b*) have not been altogether neglected. Importance is attached in the paragraphs on prenursing courses to the value of contact with students doing other work; in the paragraphs on "earning and learning" schemes to the desirability of introducing nursing as an integral part of the much wider national service for better health. During the actual period of training in hospital, one of the most promising aspects of student organisation—as carried out, for example, under the ægis of the Student Nurses Association—is the encouragement given to members to participate in public affairs. The resultant broadening of outlook should be further developed once the nurses have completed their training. To quote from page 56 of the report:

> "They should have a bias towards social service, but ought not to feel that a life of absolute selflessness is required of them; rather that, though the life brings its own great rewards, they will be expected, outside their purely professional work, to play a constructive part as citizens in their own locality."

FRANCES G. GOODALL,
Royal College of Nursing, W.1. General Secretary.

POSTGRADUATE DEGREES

SIR,—The letter in your issue of Jan. 1 from a Service Medical Officer, who is unable to take postgraduate degrees is, in my experience, unnecessary, for such degrees are apparently worthless. Here is my short story. After an absence of three years, due to active service and war injuries, I returned to London. I have applied for three hospital appointments. The first was given to a man who had already fifteen hospital appointments. I am still waiting the result of the interview for the second which was held five months ago. The third, although the hospital rules stated firmly that none but an English fellow should be appointed, was given to a man who did not possess the FRCS (Eng.); moreover, I was told by one of the staff that my application was useless, as the election had been rigged long before. Of course, it may just be me. Fortunately neither my colleagues nor my patients think so. There are compensations. My game of bridge has improved enormously, and my golf handicap is well down in the single figures.

EX-SERVICE MEDICAL OFFICER.

SIR,—A Service Medical Officer seems to be taking a rather jaundiced view of life. I do not think there are many young men sitting comparatively pretty in EMS posts, taking higher degrees, such as their MRCP, 6 or 12 months after qualifying. These young men, within 6 or 12 months of qualification, are holding only A or B_2 house-jobs, which are open to every newly qualified practitioner. Further, if in this time they can obtain an MRCP or FRCS, they are geniuses, and deserve their successes. House-jobs these days mean hard work, and certainly not a 48-hour week with plenty of time to study. By contrast, the service MOs I have met assure me that they would have ample opportunity to read if the spirit was willing. But one more than averagely intelligent MO told me that it was easy to fall into the delightful habit of doing nothing all day. Whilst not decrying the sacrifices made by those who join the Services I feel that they have an equal if not better opportunity of reading for higher exams than those of us who are in house-jobs—if they are stationed in England, as is "Service MO." If they lack clinical material I am sure no hospital would refuse them admission, certainly not this one.

Pull up your socks, "Service MO," and get down to some real hard study.

Boscombe, Hants. REX FENDALL.

SIR,—The letter signed "Sam Weller" in your issue of Jan. 15 convinces me that the term "unjust" is a most conservative one. I expect that after the war Service medical officers will be judged, quite apart from their sacrifices, on their knowledge, capabilities, and personality, by the responsible authorities, and to them we are quite content to leave the matter. But that is for the future; we are concerned with the present. I think we hardly need the sympathy of your correspondent; for

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actions speak far louder than words. While recognising genuine cases, I am afraid that there are a large number of young people taking postgraduate degrees, with no responsibilities at all, who have not made the slightest sacrifice; but then, of course, we must remember, as your correspondent points out, that they have been, and still are, living "under the shadow of the call-up"!

A SERVICE MEDICAL OFFICER.

FAITH-HEALING

SIR,—Your peripatetic correspondent's examination of the position of the faith-healer *et hoc genus omne* encourages the recital of an experience which supports his generalisations.

A lady consulted me for paroxysms of sneezing and supplied the following interesting and illuminating history. She was a leading comedy actress so that her disability if not serious was, to say the least, exceedingly inconvenient. Disappointed and disgusted at the failure of orthodox practitioners, she turned to a well-known osteopath who treated her by a vigorous manipulation of the nose. As one would have expected, immediate complete relief ensued. Overflowing with gratitude, she visited her saviour the following morning (Saturday) to express her admiration, associated I have no doubt with a few ill-chosen words directed to the medical profession. On Sunday morning, sternutation recurred to an hitherto unprecedented extent and was in full blast when I saw her on Tuesday. "I suppose you went back to him yesterday to tell him," I hazarded with little hope and less expectation of receiving anything more than a shamefaced negative.

And so I pondered the situation. The expert in manipulation would claim a cure where the medical profession had failed. And for the best of reasons. Unsolicited, the patient had come to tell him. What better proof could have been forthcoming? He would be fully entitled to believe in his wisdom and superiority. Indeed how many of us would be different if we heard only of our successes and never of our failures?

Brook Street, W.1. ADOLPHE ABRAHAMS.

Obituary

FRANCIS WILFRED WILLWAY

M D, M S, LOND, F R C S

Mr. Wilfred Willway, assistant surgeon to Bristol Royal Infirmary and to the West End Hospital for Nervous Diseases in London, died on Jan. 6 at the age of 36. Several years ago he developed Hodgkin's disease, but in spite of physical disabilities he achieved a prodigious amount of work and his courage and cheerfulness never failed him or others. Indeed his illness became the touchstone which proved the rare quality of his spirit.

Elliott & Fry

Son of the late Dr. Frederick Willway, for many years superintendent of the Royal National Mission to Deep Sea Fishermen, his early years were spent in the family home at Streatham. He graduated B Sc (hons.) in 1928 before going on to King's College Hospital where he qualified in 1930 and was awarded the Jelf medal. In successive years he obtained the MB, the FRCS, the MS and MD. He held house-appointments at his own hospital, at the Ross Institute for Tropical Medicine and the East Sussex Hospital before he became RSO at the Manchester Children's Hospital and later at KCH. The first papers he published showed his interest in fractures and dislocations, but he was soon attracted by the possibilities of neurosurgery and his appointment as surgical registrar to the Bristol Royal in 1936 gave him the opportunity to become the pioneer of this branch of surgery in the West Country. Not long ago he stepped up to an appointment on the honorary staff of the infirmary, but while still a junior member he was accredited EMS specialist at the neurosurgical centre established at the Burden Institute.

Willway was one of the first neurosurgeons to employ Freeman's modification of Moniz's operation of prefrontal leucotomy. He concluded his description of his technique in his Hunterian lecture of 1942 by saying that though he thought it likely that the method would, in years to come, be regarded with either laughter or horror, at present it gave results in otherwise hopeless cases and he proposed to continue with it until some better method was found. His resolution has been justified by the considerable success achieved in a series of 112 cases. A medical colleague at the institute adds "although Willway's interest in the procedure was primarily surgical, and he never laid claim to any technical psychological or psychiatric knowledge, he took a keen interest in these patients and his shrewd practical observations showed a real understanding of human nature."

Busy as he was Willway always found time for his students and his logical grasp of essential and clear presentation made him an excellent teacher. During the blitz of 1940–41 he worked with a mobile surgical unit, as well as at the Burden Institute and at the Infirmary, and his scheme for the reception of casualties quickly brought order out of confusion. A. W. A. writes:

"Wilfred Willway was the stuff of which surgical giants are made. He combined the mind of a scientist with a keen sense of humour, and a relentless pursuit of truth with warm humanity. Versatile and well informed he was a gifted talker on most diverse topics within and without the realm of surgery, and his remarks always seemed to lighten and brighten any discussion. He had a burning enthusiasm for the highest standard of technical excellence, and with his brilliant mind and capacity for organisation was fast becoming a leading force in our midst. For his hospital colleagues the one mitigation of this tragedy is that, true to his invincible spirit, Wilfred Willway 'died fighting.'"

JOHN ALLAN CRAIGIE MACEWEN

M B GLASG, B SC, F R F P S

Mr John Macewen, who died at Woodside Crescent, Glasgow, on Jan. 12 was the eldest son of Sir William Macewen, and worthily upheld the surgical tradition in that city. After qualifying with honours in 1897 he went abroad to study the operative procedures and surgical technique of continental masters, returning to house appointments at the Western Infirmary under McCall Anderson and his own father, to whom for 25 years he was to be university assistant. In 1900 he volunteered for service as civil surgeon to the British Army in South Africa, and then threw himself wholeheartedly into the teaching of surgery. At this time he was also dispensary surgeon to the Glasgow Royal Infirmary, and surgeon to the Elder Hospital, Govan. During 1914–18 he served as captain RAMC(T), surgeon in No. 4 General Hospital, Stobhill, and consultant to several Naval hospitals and the Princess Louise Scottish Hospital for limbless sailors and soldiers—tasks which occupied every hour of the day and often much of the night. In the summer of 1918 he was attached to military hospitals at Etaples where he witnessed the almost nightly bombing of wards full of sick and wounded. In later years he became surgeon to the Royal Infirmary, and in 1924 was appointed to the chair of surgery at St. Mungo's College, which he relinquished recently on account of failing health. In a life of unremitting toil he gained in full measure the confidence and affection of patients, nurses and students. He was one of the most successful teachers that the Glasgow school of surgery has ever produced.

MORE BEDS AT QUEEN CHARLOTTE'S.—Queen Charlotte's Maternity Hospital, Hammersmith, has now received licences for building material to complete part of the half-finished nurses' home (see *Lancet*, Dec. 18, p. 784). Work is to begin at once and it is hoped that in about seven months the nurses will be able to move into their new quarters and set free an extra 40 beds in the hospital itself for the public. The hospital will thus become eligible for the gift of £30,000 promised by the Bernhard Baron trustees on condition the work was finished by the end of the year.

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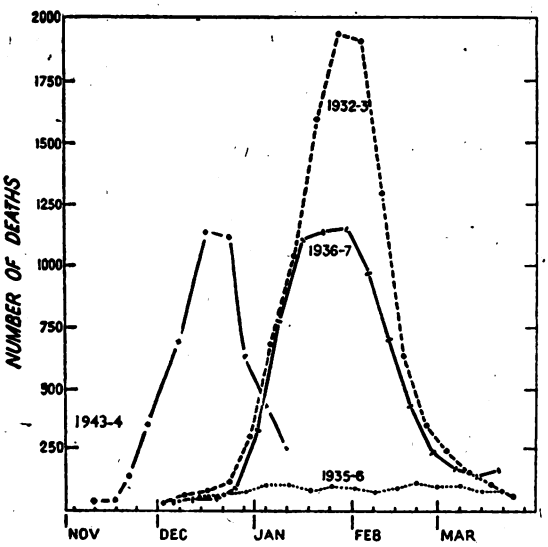
Public Health

THE INFLUENZA EPIDEMIC

ONLY 255 deaths from influenza were reported from the great towns of England and Wales in the first week of January. In its remission the curve still follows closely the precedent of previous epidemics which occurred later in the winter. Sheffield with 13 deaths and Liverpool with 12 were the only towns, apart from London (31), reporting double figures.



Infectious Disease in England and Wales

WEEK ENDED JAN. 8

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 1791; whooping-cough, 1793; diphtheria, 661; paratyphoid, 4; typhoid, 4; measles (excluding rubella), 515; pneumonia (primary or influenzal), 1608 (last week 2009); puerperal pyrexia, 147; cerebrospinal fever, 92; poliomyelitis, 3; polio-encephalitis, 1; encephalitis lethargica, 1; dysentery, 165; ophthalmia neonatorum, 64. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Jan. 5 was 1713. During the previous week the following cases were admitted: scarlet fever, 111; diphtheria, 44; measles, 20; whooping-cough, 90.

Deaths.—In 126 great towns there were no deaths from measles or scarlet fever, 1 (0) from an enteric fever, 7 (1) from whooping-cough, 22 (2) from diphtheria, 44 (11) from diarrhœa and enteritis under two years, and 255 (31) from influenza. The figures in parentheses are those for London itself.

Carlisle reported the fatal case of enteric fever. There were 7 deaths from diarrhœa at Birmingham.

The number of stillbirths notified during the week was 228 (corresponding to a rate of 32 per thousand total births), including 29 in London.

RECRUITMENT OF LABORATORY ASSISTANTS.—Under procedure arranged with the Ministry of Labour by the Medical Research Council, skilled laboratory assistants engaged in human pathology and medical bacteriology are granted deferment on the ground that they are indispensable in the particular posts they hold. Such deferment automatically ceases if they change their employers, though not if they are merely moved from one post to another within a single service. A prospective employer desiring to appoint a pathological laboratory assistant who has been granted deferment in respect of another post should ascertain from the Medical Research Council, before the change is made, whether deferment can be continued. If the transfer is approved, the Council will ask the Ministry of Labour to take the necessary action. As a general rule, a second transfer of the same man within a short period will not be approved. "Deferred" laboratory assistants whose employers are in a position to release them may be recruited in their occupational capacity if urgent demands from the Services have to be met.

Notes and News

THE FUTURE OF PHARMACY

RECEIVING the Hanbury memorial medal of the Pharmaceutical Society of Great Britain on Jan. 13, Sir Henry Dale, PRS, gave an address on the natural history and chemistry of drugs, in which he raised the question of the future function of pharmacy. "We must regard it as inevitable," he said, "that the preparation of the remedies required by a progressive therapeutics will eventually fall into the hands of a scientific large-scale manufacture and that the rôle of the individual pharmacist in relation to them will become little more than an intelligent retail distribution of ready-made and centrally standardised products." But if the tremendous advances which research is making were to be made properly available for the ordinary citizen in his home there would have to be important changes in the organisation of medical practice. "It must be but rarely that, under the present conditions of domestic practice the doctor can obtain for his patient, or the patient receive through his doctor, all that science now offers in such growing profusion." Unless the practitioner was to become a mere sorting machine to secure the transfer to hospital of every case requiring serious scientific attention, it was surely inevitable that general practice should acquire such an organisation that the common laboratory facilities afforded by any modern hospital could be made accessible to any practitioner. If so, a very large number of new laboratory centres with well-trained men would be required. "I suggest for your consideration," concluded Sir Henry, "that the nearest equivalent to the expert coöperation which was afforded by the work of Daniel Hanbury and the pharmacists of that old tradition to the medicinal treatment of their own days may be found under modern conditions in the aid which diagnosis and treatment still increasingly need from the laboratory. It seems to me that it is along these lines, if at all, that it might be possible among the general body of pharmacists to recover something equivalent in its scientific interest and its coöperative value to the expert knowledge, offered by their predecessors, of 'the natural history and chemistry of drugs.'"

SCHISTOSOMIASIS IN EAST AFRICA

THE September number of the *East African Medical Journal* directs special attention to schistosoma infections in Kenya. In civil practice such infections are not very common, though it is likely that many sufferers in the indigenous population do not seek medical advice. For some unknown reason 185 cases of infestation by *Schistosoma mansoni* came under treatment in Nairobi between June, 1942 and June, 1943. Of these 24 were Europeans, 23 Asiatics and 138 Africans. In the streams about the town Major Cunningham Van Someren has identified three varieties of freshwater snail, *Bullinus tropicus*, *Lymnæa cailludi*, and *Biomphalaria pfeifferi*, housing the ciliated miracidia hatched from the ova derived from the human host. E. A. Trim, in an interesting account of the clinical features of the cases seen, emphasises the importance of the toxic effects in the early stages, especially among Europeans, and the hepatic cirrhosis found in chronic cases. An editorial quotes the Director of Medical Services, East African Command, on the influence of schistosomiasis on military service. He finds that it is one of the principal causes of the rejection of recruits, particularly in Tanganyika and Northern Rhodesia. The urine of all recruits coming from areas in which schistosomiasis is endemic is examined microscopically. If ova are found, a course of tartar emetic is given at the depôt and the recruit is accepted only when he is symptom-free. Once the man has been passed for service schistosomiasis rarely gives trouble, and it is responsible for under 6 per 1000 of all admissions to hospital. The relative proportion of bladder to bowel cases during three years' work at the largest African hospital was *S. hæmatobium*, 511 cases, *S. mansoni*, 244.

University of Glasgow

On Jan. 15 the following degrees were conferred:

MD.—K. S. Alstad and James Black (with high commendation); A. L. Goodall (with commendation); and A. C. Penman.

PhD (in the faculty of medicine).—Albert Sharman, MD.

LLB.—R. P. Brittain, MB.

MB, ChB.—R. M. Archibald, Donald Beaton, Ellen S. Bell, G. M. Burns, Robert Burns, Colum Cameron-Mowat, K. D. Cochran, L. N. Cook, Margaret P. Deighan, N. C. Dick, Mary C. Douglas, A. M. S. Elfehfah, Margaret J. W. Finlayson, James Fraser, T. M. Gardner, Mary E. Hamilton, E. W. Hutcheson, Paul McCulloch,

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D. A. MacDonald, W. G. McEwen, T. S. Macfarlane, M. M. Macgregor, James Maclachlan, R. W. Meikle, Robert Meldrum, Katherine G. Miller, M. S. Miller, R. F. Miller, Robert Mitchell, Alexandrina Moffat, Lilias M. Money, Bertie Moscow, Monica M. A. Murphy, W. L. Newbigging, Hetty B. Ockrim, W. G. Paterson, H. A. Rankin, F. E. Roche, L. S. Scott, M. K. M. Scrimgeour, Jacob Shapiro, Catherine G. Simpson, J. M. Sinclair, Margaret F. Smith, D. J. Stewart, E. M. Stirling, Agnes C. Sutherland, Robert Thomson, J. D. Wilson, Marjorie B. Wilson and J. D. Wimbs.

Royal College of Surgeons of England

At a meeting of the council of the college held on Jan. 13, with Sir Alfred Webb-Johnson, the president, in the chair, it was reported that Prof. G. Grey Turner is to deliver the Hunterian oration for 1945.

Diplomas of membership were granted to Basil Haigh, Alan Taylor and Margaret R. Todd, and the following diplomas were granted jointly with the Royal College of Physicians:

DPH.—J. C. Boyle and Marjorie Swain.

DPM.—Elizabeth G. W. Barker, Harry Coates, Esther A. Davidson, J. E. Glancy, Reinhard Krambach, H. G. Miller, Margaret V. Saul and G. C. Tooth.

DLO.—Francis Bauer, G. A. Coggin, K. W. MacKenzie, P. C. Rushton and J. A. B. Thomas.

Medical Superintendents Society

A meeting of the council will be held at the Midland Hotel, Derby, on Saturday, Jan. 29, at 2.30 PM, and continued on Sunday, Jan. 30, at 10 AM.

British Institute of Philosophy

On Wednesday, Jan. 26, at 4 PM, Mr. A. C. Ewing, lecturer in moral philosophy at the University of Cambridge, will speak on states and their ethics. The lecture will be held at 14, Gordon Square, London, W.C.1.

Medical Casualties

Surgeon Lieutenant Philip Graham Jeffries, MB CAMB., RNVR, is reported to be missing, presumed killed. Major G. S. Riddell, MB ABERD., RAMC, has been posted as a prisoner of war.

Royal Institute of Public Health and Hygiene

The following lectures are to be held at 28, Portland Place, W.1 at 3 PM on Wednesdays, February and March: Dr. William Evans, recent research in heart disease (Feb. 9); Prof. L. J. Witts, psychology in relation to industry (Feb. 16); Dr. G. W. Bray, allergic diseases (Feb. 23); Mr. Frank Law, ophthalmology (March 1); Dr. A. H. Harkness, venereal diseases (March 8); Dr. Wilfred Pearson, disease in children (March 15); Mr. H. E. Griffiths, rehabilitation (March 22); and Prof. Evelyn Sprawson, diet as it concerns the teeth and gums (March 29).

Medical Films in Bristol

The programme of medical films which is to be shown at the Odeon Theatre, Broadmead, Bristol, on Sunday, Feb. 6, at 10.45 AM is to include the new documentary *Surgery in Chest Diseases*, which is to be introduced by Surgeon Rear-Admiral G. Gordon Taylor. The film was reviewed in the *Lancet* of Sept. 25 (p. 393).

Association of Clinical Pathologists

The seventeenth annual meeting will be held at Guy's Hospital, London, S.E.1, on Friday, Jan. 28, and Saturday, Jan. 29. The meetings will begin each day at 9.15 AM, and the speakers will include: Dr. S. R. Gloyne (bronchial biopsy), Dr. J. G. Greenfield (encephalitis), Dr. H. S. Baar (fibrocystic disease of pancreas), Dr. P. A. Gorer (leukæmia in man and mouse), Dr. R. G. Macfarlane (variability of results with haemoglobinometer), Dr. Patrick Kidd (hæmoglobin estimation by photometer), Prof. R. A. Peters, FRS (blood pyruvic acid), Dr. I. R. Morris (blood volume), Dr. Keith Simpson (trivial cause of sudden death), Mr. C. Rimington, PH D (porphyrin estimation), Dr. J. L. D'Silva (ascorbic acid saturation tests), Dr. A. H. T. Robb-Smith (lymphoid follicular reticulosis), Lieut.-Colonel R. F. Bridges (serological identification of dysentery bacilli) and Dr. A. Q. Wells (laboratory diagnosis of tuberculosis). Dr. A. F. Sladden will deliver his presidential address at 4.30 PM on the second day of the meeting. His subject is the significance of the laboratory.

Royal Society of Medicine

On Monday, Jan. 24, at 4.30 PM, at the section of odontology Mr. W. Stewart Ross, LDS, will speak on the pathology and treatment of the exposed vital pulp. On Jan. 25, at 4.30 PM, Dr. Donald Hunter will read a paper on the clinical approach to industrial medicine. Dr. Donald Stewart and Dr. Donald Norris will also speak. On Jan. 27, at 4 PM, the section of psychiatry is holding a joint meeting with the Medico Legal Society at 26, Portland Place, W.1, when Dr. W. Norwood East is to read a paper on criminal responsibility and medical culpability. On the same day, at 5 PM, at the section of urology, Mr. R. H. O. B. Robinson and Mr. J. C. Ainsworth-Davis are to open a discussion on the diagnosis and treatment of infections of the male genital organs other than tuberculosis and gonorrhœa. On Jan. 28, at 2.30 PM, the section of epidemiology and state medicine is holding a discussion on aspects of the work of the almoner in a national health service. The opening speakers will be Miss D. Manchee, Mr. E. Ridley and Dr. J. A. Charles. The programme of the meeting of the section of disease in children, which is being held the same day at 4.30 PM, has been arranged by a group of American paediatricians, and will be introduced by Brigadier-General Paul Hawley. The following papers will be read: Lieut.-Colonel Henry Pratt, the American approach to allergy in childhood; Major Thomas McNair-Scott, herpetic stomatitis in infants; Major Charles May, fibrosis of the pancreas in childhood; Captain Mila Pierce, nutritional survey of English children in war-time.

There are three kinds of people. There are those in favour of Beveridge, those against him, and those who have read him.—Dr. L. S. POTTER, assistant secretary of BMA, quoted in *Evening Standard*, Jan. 10.

Appointments

BURNETT, W. W., MB MANC.: examining factory surgeon for Sedbergh, Yorks.

FLEMING, JAMES, MB GLASG.: examining factory surgeon for Polmont, Stirlingshire.

MACGILL, A. M., MB MANC.: medical referee for the county-court districts of Ashton-under-Lyne, Stalybridge, Hyde and Stockport (circuit No. 10).

MILLER, LE ROY, LMSSA: resident surgical registrar at King George Hospital, Ilford.

YOUNG, R. F., MC, MB CAMB, FRFPS: medical referee for the sheriff-court districts of Glasgow, Lanark, Hamilton and Airdrie.

Births, Marriages and Deaths

BIRTHS

FISHER.—On Jan. 11, at Salisbury, the wife of Surgeon Commander H. Holdrich Fisher, RN—a son.

PELMORE.—On Jan. 7, at New Swanage, Dorset, the wife of Flight-Lieutenant John F. Pelmore, MRCS—a son.

RAYNER.—On Jan. 7, at Exeter, the wife of Major M. S.-M. Rayner, RAMC—a son.

ROUTLEDGE.—On Jan. 13, at Reading, the wife of Captain L. R. Routledge, RAMC—a daughter.

STERN.—On Jan. 11, at Twickenham, the wife of Mr. David Stern, FRCS—a daughter.

WATTS.—On Jan. 10, in London, the wife of Captain C. H. Watts, RAMC—a son.

WELBOURN.—On Jan. 8, at Amersham, to Dr. Esther Welbourn (née Hendry), the wife of Lieutenant D. B. Welbourn, RNVR—a daughter.

WOOD.—On Jan. 12, the wife of Flying Officer Michael Wood, MB, of Swindon, Wilts—a daughter.

MARRIAGES

ALLEN—JONES.—On Jan. 12, at Leigh-on-Sea, James Allen, major RAMC, to Olwen Jones, lieutenant, RAMC.

MANN—TAYLOR.—On Jan. 4, in London, P. G. Mann, lieutenant RAMC, to Barbara Mary Taylor.

WALTON—LYNE.—On Jan. 14, in London, Anthony James Walton, surgeon lieutenant RNVR, to Joy Lyne, QARNNSR.

DEATHS

CLARKE.—On Jan. 11, in Reading, Henry Milford Clarke, BA, MB Camb.

JOLLYE.—On Jan. 14, at Alresford, Hants, Francis William Jollye, MD, DURH., FRCSE, DPH, aged 80.

STEVENSON.—On Jan. 10, William Edward Stevenson, MB DURH., of St. Arvans, late medical superintendent, Ministry of Pensions Hospital, Chepstow, Mon.

WILLIAMS.—On Jan. 10, Thomas John Williams, MD LOND, of Liverpool, aged 64.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export.

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PSYCHOSOMATIC CASUALTIES IN THE MIDDLE EAST *

ALFRED TORRIE, M B ABERD, D P M; MAJOR RAMC
SPECIALIST IN PSYCHOLOGICAL MEDICINE

To the treatment of war neurotics an attitude of therapeutic nihilism has arisen, which is not always justified. Of 1000 cases of anxiety neurosis and hysteria discussed in the second part of this article 89·9% were returned to duty (58·6% to full duty) and only 5·4% were invalided out of the Service.

2500 Psychosomatic Casualties

The period under review included the retreat to El Alamein and the advance from there to Tripolitania. Psychiatric casualties went through several filters before they reached us: rest centres, advanced base hospitals acting as casualty-clearing stations, and general hospitals. Few were admitted within 4 days of evacuation from the forward area. The milder cases were dealt with in forward medical units and a high proportion returned to the battle area within a week or 10 days. Many had treatment in the medical wards of other hospitals before being transferred; 8% were admitted direct from their units in the base area. Some 30 nationalities were represented among the 2500 cases treated in our base psychiatric hospital. All were under commissioned rank. The diagnoses are shown in table I.

TABLE I—DIAGNOSES IN 2500 CASUALTIES ADMITTED TO A BASE PSYCHIATRIC HOSPITAL

Diagnosis	%	*Diagnosis*	%
Anxiety neurosis ..	890 (35·6)	Organic states ..	138 (5·5)
Hysteria	646 (25·8)	Paranoid states ..	21 (0·84)
Psychopathic personality* ..	259 (10·4)	Reactive depression	21 (0·84)
Endogenous depression	186 (7·4)	Neurasthenia ..	13 (0·52)
Mental dullness ..	147 (5·9)	Physical exhaustion	11 (0·44)
Schizophrenia ..	146 (5·8)	Mania	10 (0·40)
		Obsessive-compulsive neurosis ..	12 (0·48)

* Including temperamental instability.

Psychopathic personality (259 *cases*).—In this class are included those borderline cases whose character reaction traits are not to any great extent modifiable. They often prove good soldiers in spite, or perhaps because, of their antisocial tendencies. They are generally delinquent and "agin the government." Many of them were salvaged for further service. Subclassifications of these cases—schizoid, paranoid, sexually perverted, &c.—were found helpful, especially for prognosis if a psychosis developed later. The temptation to include chronic hysteria and chronic anxiety neurosis in this group was resisted. It was felt that it was using the diagnosis as a ragbag for those who respond poorly to treatment and might be an excuse for a laisser-faire attitude. Cases of reactive depression are not included under anxiety neurosis. Men with *temperamental instability* are constitutionally incapable of bearing long strain and stress and are also not amenable to any great change in their mental make-up. Many alcoholics came under this heading.

Mental dullness (147 *cases*).—These were soldiers whose lack of native intelligence was the main feature in their illness. Other cases suffered from a comparable degree of mental defect but the major conditions were those of a neurosis or psychosis under which headings they are included.

Depression (186 *cases*).—There has been much discussion on the differentiation of endogenous from psychoneurotic depression. The cases included under this heading are those in which the endogenous element predominated. They are largely responsive to convulsion therapy which assisted in confirming the diagnosis.

Organic states (138 *cases*).—Those psychiatric casualties whose mental symptoms were secondary to, or caused by, a physical disability. A number of cases sent for investigation as psychiatric casualties proved on examination to be suffering from a purely physical malady. Caird (1943) during 3 months saw as many as 16 patients presenting the symptoms of anxiety neurosis (tremors, tachycardia, dyspnœa, insomnia, anorexia, sweating, &c.) who were found to have fibrosis of the lung, a condition developing comparatively rapidly in the Egyptian deserts. Other physical conditions causing psychiatric symptoms included malaria, alcoholism, syphilis, epilepsy, physical exhaustion, concussion, vitamin deficiency, drug-addiction and various septic foci.

CONTRIBUTORY FACTORS

The causes leading to the final psychiatric breakdown are multiple and the battle experience is often the culminating factor. A higher proportion of psychiatric casualties was found in units with very little corporate life, such as small teams of drivers in the lines of communications exposed to frequent dive-bombing. There is a higher rate of neurosis among married men, possibly because of their concern over the welfare of their dependants (table II).

TABLE II—ANALYSIS OF RELEVANT FACTORS IN 2500 CASES

	%	*Onset*	%
Married	575 (23)	Battle area ..	795 (32)
Single	1925 (77)	Base area	1705 (68)
Age (yr.)		*Previous personality*	
20 and under ..	101 (4)	Timid	2265 (91)
20 to 25	807 (32)	*Education and intelligence*	
25 to 30	752 (30)	Below aver. group*	— (44)
30 to 40	708 (28)	Above aver. group†	— (6·6)
40 to 50	132 (5)	*Family history*	
Service (total)		Negative	1833 (73)
1 year and under ..	182 (7)	Positive	667 (27)
1 to 2 years ..	560 (22)	*Civil employment*	
2 to 3 years ..	915 (37)	Regular	1848 (74)
3 to 4 years ..	354 (14)	Uncertain	652 (26)
4 years and over ..	489 (19)		
Service (ME)			
3 months and under	227 (9)		
3 to 12 months ..	741 (30)		
12 months and over	1532 (61)		

* Less than 38/60 Raven. † More than 48/60 Raven.

The age-groups correspond quite closely to the figures for the normal Army population apart from a higher incidence in older men. It is significant that in a high proportion of cases service had exceeded 4 years—that is, they were peace-time soldiers who had long been absent from their homes. During the autumn of 1942 25% of the cases admitted to one ward had been in the country for less than 3 months.

In a group of these psychiatric casualties examined at a main dressing-station during the October-November battle of El Alamein, the main factor in half was dullness and backwardness, which would not have escaped a psychiatric net at home. About 2 in 3 of these men had not been exposed to battle. The predisposing causes in the base area included maladaptation to climatic conditions, mainly heat, sun and flies. Some of the patients should have been encouraged to adapt first. During the voyage out the men had been given lectures unduly stressing the dangers resulting from exposure to the sun; recently, graduated sunbathing on outgoing troopships has acclimatised the men. Generally speaking the homesick soldier attaches undue influence to climatic conditions other than those of his mother country. The flies are indeed a plague, but are reduced in well-schooled units. An important predisposing factor with both battle and base neurotics is the irregularity of mail from home, emphasising the separation factors. Nearly all were timid in temperament; in assessing combative temperament I used, in many cases, a modification of Cattell's "assertion-submission" test.

As regards intelligence, 44·4% were in the first quarter of a normal curve. The tests used were the Raven matrix or Kent oralnorm, or both. More than 1 in 4 patients had neurotic or psychotic taints in relatives of the first degree, and a similar proportion showed unsatisfactory work records. The history was held to be negative if no admission of psychosis or psychopathy in first-degree relations was obtained; "nervousness" or "nerves" in these relations were not regarded as evidence of a positive history.

PRECIPITATING FACTORS

The main precipitating factor in a third of the cases was exposure to a direct threat to life by explosive

* I use the term "psychosomatic" deliberately in place of "psychiatric," and in a wider sense than is usual, to emphasise body-mind unity.

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violence of various kinds. The statement of patients about their nearness to the explosion is not always to be taken as accurate; in retrospect they are prone to exaggerate. Sometimes the onset followed the severe wounding or death of a fellow soldier with whom there were emotional ties. Mine-lifting in battle is a desperately nerve-racking affair. One important factor was the change of a soldier from a unit where the leadership is good to one where there is lack of faith in the leader, with consequent lowering of morale and onset of neurosis. Psychiatrists can make useful contributions to morale, but it is not primarily a medical matter. Weapons, training and leadership must be adequate; in West Africa malarial incidence charts indicate the units that are badly disciplined, and neurosis incidence charts give similar hints.

DIAGNOSIS AND DISPOSAL

The first 1201 discharged from the neurosis division are classified in table III according to diagnosis and

TABLE III—DIAGNOSIS AND DISPOSAL OF FIRST 1201 CASES DISCHARGED FROM THE NEUROSIS DIVISION

Diagnosis	*Cases*	*Disposal*	%
Anxiety neurosis ..	716 } 1000	Returned to duty ..	87·1
Hysteria	284 }	Full duty	51·6
Mental defect ..	62	Duty outside battle area	35·5
Psychopathic personality	56	Evacuated to U.K. ..	7·8
Depressive states ..	36	Transfer to other hospitals	5·1
Organic states (including epilepsy)	28		
Neurasthenia ..	13		
Obsessional neurosis	6		

disposal. As in the classification given in Price's *Textbook of Medicine*, neurasthenia was regarded as an organic neurosis showing asthenia, hypotonia and hypotension. Cases developed after protracted febrile illness or exhausting conditions like dysentery, typhoid, long periods in the desert with loss of weight and a hypotonic hypothyroid condition accompanied by diminished secretion of sweat. Depression and hypochondriacal ideas were almost always present. The prognosis for retention in the Command was bad. Treatment was mainly physical and dietetic. Cases of obsessional neurosis are rarer than in civil practice because there is lessened guilt over unconscious aggressive impulses, these being sanctioned and indeed encouraged in wartime. The cases of obsessional neurosis seen required a renewal of sanction of their instinctual wishes and a return to their former duties, since they sometimes were incapacitated in a minor degree only.

1000 Cases of Anxiety Neurosis and Hysteria

The disposal of 1000 cases of anxiety neurosis and hysteria receiving psychotherapy is shown in table IV.

TABLE IV—DISPOSAL OF 1000 CASES OF ANXIETY NEUROSIS AND HYSTERIA AFTER PSYCHOTHERAPY

	%		%
Returned to duty ..	89·9	Transferred to other hospitals	4·7
Full duty	58·6		
Duty in the Command	31·3	Relapsed within 6 months	8·4
Evacuated to U.K. ..	5·4		

All but a few were British troops; 24·5% had had a previous neurosis. It is felt that the correct diagnosis of perhaps over 80% should be anxiety hysteria, but the Army nomenclature then in use was followed. A separation was made in a general way by grouping under anxiety neurosis those showing a lesser degree of somatic symptoms. The case-histories were obtained from the soldier himself and verification was seldom possible. Experience of interviewing leads to sifting of the material. There is no reason to believe that the percentage of inaccurate statements from such men is high (Hadfield 1942). Varying degrees of neuropathic instability in parents or siblings were reported by 56%, but that does not necessarily mean that this is a major factor. The child of a neurotic parent is brought up in an emotionally insecure environment, but removal from contact with the affected parent may, in spite of any inherited tendency, prevent the disease.

Those cases are not included where the main ætiological factor was physical; these comprised dental sepsis, subclinical vitamin deficiency, mainly B_1 and B_2 (the former chiefly in immoderate drinkers and the latter in men who had been on desert rations for a long period), septic dermatitis (so-called desert sores), pulmonary fibrosis, venereal disease, slow healing wounds, head injury, alcoholism as both a symptom and a cause, otitis media, cardiovascular disease and diseases of the central nervous system.

Cases of what may be called simple neurosis from exhaustion were few, these having been dealt with at rest centres farther forward or at an advance base general hospital; 600 such cases were treated in one hospital and after 7–10 days' rest and sedation the bulk returned to duty. There were 20 cases diagnosed as suffering from a prolongation of normal anxiety with no psychopathology of repression. It has been suggested that the term for this condition should be hyperphobosis (or philologically more correctly, hyperphobesis).

SYMPTOMS

Table V shows the order of frequency.

Headache often began at the first port of call on the way out; physiological at first, as a result of poor adaptation to tropical conditions, it became, when a

TABLE V—MAIN SYMPTOMS IN ORDER OF FREQUENCY IN THE FIRST 1000 CASES OF ANXIETY NEUROSIS AND HYSTERIA

	%
Headache	30·4
Anxiety (from apprehension and fear to terror and panic)	26·4
Tremor, tremulousness	26·3
Disturbed sleep	21·6
Depression	20·7
Physical factors (forming foci of symptoms)	19·3
Lack of concentration, apathy	16·9
Visceral symptoms (gastro-intestinal, vesical)	12·9
Dizziness	12·0
Hypersensitivity, irritability	11·4
Lassitude, fatiguability, exhaustion	10·4
Cardiovascular, palpitation, flushing	9·3
Amnesia (including fugue)	8·6
Pareses (hysterical, aphonia, monoplegias, paraplegias, amblyopia, deafness, &c.)	7·7
Battle dreams	7·7
Stupor confusion	6·6
Stammer	5·1
Hypochondriacal preoccupation	5·0
Paranoid ideas	3·3
Tics	1·7
Feelings of unreality	0·3

neurosis supervened, the main preoccupation. Autonomic instability and poor adaptation to temperature changes were present in many. Postconcussional headaches were not common. Nor was insomnia, which was seen mostly in the early cases. Those who were losing manifest anxieties and developing hysterical reaction complained of sleeplessness. It was beneficial to have them wakened up occasionally to prove to them that they could sleep excellently.

Many men complained of having been depressed immediately after exposure to an explosion. On careful inquiry it appeared that what was meant was a dazed feeling—a sort of stupefaction. Concurrent organic conditions aggravated the neuroses. When the neurosis was secondary the main condition was treated where possible in the appropriate medical ward or hospital, preferably in conjunction with psychotherapy. Many neurotics ascribe their condition to long-past illnesses or injuries—such as falling out of a perambulator in infancy or to injuries and trivial wounds sustained at work in civil life or in the Army. It was significant that no such importance was attached to similar or even greater injuries sustained during recreation. Men of low morale prolonged their stay in general hospitals by a hypochondriacal attitude to their condition, then long past the disabling stage. Repression of the painful experience with a minor or major dissociation resulted in a fugue in some of these. Many cases were more aware than they would admit and recovered their lost memories with remarkable celerity. In the genuine cases improvement followed the recapture of the forgotten incidents after hypnosis or intravenous barbiturate, but only when assimilation and integration took place.

There were few cases of true conversion hysteria. Removal of the symptoms was fairly easy by various methods but those whose basic hysterical personality was unalterable had to be invalided.

Under the heading anxiety are included all degrees up to panic. Often objective evidence of panic was found in the history on the field medical card—a valuable

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document when properly completed. Reports of reliable witnesses gave details of purposeless behaviour such as running round in circles, screaming, jumping out of slit trenches or staying in them long after the danger was over. Many men were aware that their uncontrolled behaviour was influencing others in their vicinity and would afterwards report sick. The field medical card gave useful information of the progress of the illness at various stages during evacuation to the base. When they arrived at the psychiatric hospital some were free from symptoms; but these could sometimes be recalled by recordings of air-raids through an amplifier, and then treated.

Most men on admission had a withdrawn demeanour so that a ward with fresh cases had no corporate life. It was one of the aims of therapy to inculcate a group spirit. Some had a defiant attitude, a reaction against their sense of failure as soldiers. Others demanded their immediate discharge declaring they had been sent to a "looney bin," or alternatively to a "detention camp," since they had heard of the firm discipline of the hospital.

Analysis in 92 Cases

In the following study of 92 cases of anxiety neurosis and hysteria the conclusions and methods in no way represent an official point of view. The patients were subjected to rapid analysis, and the main ætiological factor elicited was separation anxiety. These men exhibited feelings of insecurity with dependence on, and fear of, authority. They were unable to deal with the great volume of anxiety that was lit up by the precipitating war situation.

Their anxiety was fed from many similar situations, the emotional content of which had been mainly repressed. The cumulative effect was overwhelming and rendered the man incapable of continuing as an effective soldier. In analysis, the aim was to find the prototype or theme situation which gave rise to excessive reaction to danger. In nearly all the cases there were situations in early childhood in which the patient could not deal with aggressive impulses, aroused by a threat to the safety of his emotional relationship with the parent or parent substitute. The fear of the child is not of physical death but of emotional death or separation as a result of real or fancied withdrawal of the interest or protection of the parent.

Several possible reactions followed this threat. The trust and affection of the child was turned to aggression towards the parent in a demand for significance; when this was not understood the aggression was often repressed. Restoration of the previous secure relationship was sometimes attempted by placating the parent, and becoming the good but timid child. With the repression of aggressiveness came the feeling of guilt, inadequacy and inferiority. An attempt was made by the hysteric to compel the restoration of the fancied or real loss of interest by flight into physical illness, the signal of distress.

Occasionally aggressiveness remained and formed the basis of antisocial behaviour. The result was the suspicious soldier who resented discipline but whose underlying anxiety was aroused by an imminent threat to life. Such a soldier became superficially assertive, confident and almost truculent and could deceive for a time. Others sought a solution in the substitution of power for the denied emotional security. They expected promotion, were disappointed and carried about a continual sense of grievance. They came into battle with a divided mind and danger quickly lit up their latent anxiety.

The neurotic is more selfish than his follows, has an over-developed self-preservation urge and consequently poor group ties. This is mainly a result rather than a cause.

This brief sketch of the basis of war neurosis explains the rationale of treatment. A ward environment was aimed at in which the soldier was surrounded by influences formerly lacking in his family situation, so that he could work out with the physician his conflict over aggression. Milieu therapy became an aid to psychotherapy.

ASSESSMENT

As the most important part of the psychiatrist's work, assessment demands certain qualities and abilities. The physician must know himself, his bias and his prejudices. If he has a mental scotoma for a certain type of patient who may mirror undesirable traits he himself possesses he will fail in treatment. His own sense of insecurity must not be projected, otherwise he will look on the neurotic as the wolf pack looks on the wounded wolf. A counter-transference is an insidious and damaging condition. The knowledge of the degree and complexity of mental illness is hardly come by in such an unformed science and art as psychiatry. There are, however, certain mental mechanisms and patterns of reaction to life that can be learned by long experience of psychological illnesses. Simple psychotherapy is within the province of every medical officer, but special knowledge is often necessary even to prescribe successfully the right type of treatment. A minor mental operation may make a more difficult one abortive or impossible; 90% of the cases required therapy of an abreactive and explanatory type to remove their symptoms, and where possible to produce insight. The other 10% needed some form of analysis, and as time and bed-space were limited, it had to be bold analysis with some understanding of what the aim was.

Assessment divided the patients into three main groups:

1. *No psychiatric disability.*—Many symptoms are psychogenic but not disabling. Mild anxiety well controlled may be a stimulus. Some symptoms come within the limits of normality—e.g., mild obsessions, slight eccentricities. The biographies of our famous men are full of examples. Some patients consciously exaggerate their symptoms and are largely responsible for their escapism.

2. *Psychiatric disability in certain environments.*—Psychiatrists have often tried to condition their patients to situations to which they can never adapt. This is often seen in civil practice, especially in child guidance where it is the milieu which should be altered. In Army practice the success of preselection (Rees 1943) is evidence of this method of disposal. The promise of a change of employment, often within the battle area, may suffice to remove symptoms. Severe cases cannot be made to adapt in any situation in the Army, and have to be invalided. A knowledge of the patient's previous personality and history and his degree of reaction to stress is necessary. Return to an advancing Army or to a first-class unit may complete the cure.

3. *Psychiatric disability requiring treatment.*—Most physicians know types of patients with whom they can never secure rapport. Even with mechanical treatment the personality of the physician matters a great deal to the neurotic patient. Some patients can never be cured by psychotherapy and surprising improvements result when they are informed of this fact and their attention is directed to physically permanently handicapped people who lead happy lives within their limitations.

The capacity of the soldier to stand battle conditions or overseas service must be assessed early in training; 1 in 4 of these cases should never have been sent abroad, especially the mental defective with little adaptability or emotional independence. Some dull men are excellent soldiers, and generally have had steady reliable work records in civil life, but even then they are bad bets in small and isolated units. Most of an expeditionary force is not in the battle area, and there is plenty of work for the martial misfit in other areas. It is of course possible that good men may be excluded, but this does not diminish the value of the method. One important type who should be watched is the over-confident boaster who volunteers for all sorts of jobs, says he never had a day's illness and is never afraid. He often proves to be an empty barrel.

TREATMENT

Every means, physical and psychological, was brought to bear on the patient to secure: (*a*) removal of symptoms and restoration of his condition before illness; and (*b*) if possible removal of many of the underlying causes of his illness. The removal of symptoms was often a fairly easy matter.

Many cases required physical treatment, attention to toxic foci, deficiency in hæmoglobin, loss of weight and insomnia. All acute battle casualties were given rest, sedatives in adequate doses and a generous diet. The more severe cases which were too acute for other than a physical approach were given prolonged narcosis, mainly by 'Somnifaine.' This treatment was under the direction of Captain W. R. L. James who treated 174 cases of neurosis and mild psychosis without a death and with a

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return to full duty of 30–40%. This result can be attributed in large measure to strict attention to nursing detail. Narcosis therapy facilitates analysis in suitable cases, for a wealth of repressed material can be obtained. Modified insulin therapy was begun when supplies became available. Electric convulsion therapy was used mainly in cases in which there was an element of endogenous depression, where it was eminently successful. Analeptic drugs were also used to produce artificial convulsions. In some hysterics and psychopaths euphoria produced by shock therapy was very striking and often led to increase in the good behaviour of the ward. An artificial convulsion may give the feeling of release of pent-up aggressive impulses and is followed by an amelioration of the symptoms, comparable to the cheerfulness observed after a particularly active football match.

The neurotic was always seeking for demonstrations of interest on the part of those in authority and would haunt the sister's duty room with trivial complaints of headache and the like. When reassurance failed we did not hesitate to order placebos. I soon realised that a homœopathic dose of sedative from a bottle accelerated progress in cases having simple psychotherapy.

ENDOCRINE AND VITAMIN EXPERIMENT

A small-scale experiment was made on empirical grounds. Emotion disturbs the autonomic endocrine systems and carbohydrate metabolism. The vitamins have been called the external hormones, and thiamine (B_1) is specially concerned with glucose metabolism. The sterols including testosterone have a similar function.

A group of 18 patients of the same degree of illness was selected at the beginning of their treatment by psychotherapy; 6 had daily injections of thiamine (20 mg.), 6 had testosterone propionate (25 mg.), and 6 controls had an equivalent amount of normal saline by injection. All were given a high-carbohydrate diet. After a week the first two groups were almost well. Their anxiety had disappeared and with it their battle dreams. Their psychological interviews became arid and abortive. The controls were two or three weeks longer in securing the same improvement.

GROUP AND INDIVIDUAL PSYCHOTHERAPY

In the ward the therapist represented the understanding parent, always bearing in mind that in treatment the security of the group (the regiment, the army, the nation) is of more importance than the needs of the individual. The sister in charge of the ward became the "good mother."

Most nurses prefer patients who are more or less helpless in bed and who require actual physical attention. This may satisfy their need for mothering. Few patients were in bed and these only for a very brief time during recovery from exhaustion; later they were up and about and doing various jobs in the ward and in the camp. The less understanding nurse did not feel that the men needed nursing and soon got bored with the work. To her they appeared well, and like many others she ceased to believe in the reality of their illness. The more intelligent nurses, when the nature of the man's affliction was explained, and especially when they were given parallels in the lives of apparently normal people, became interested and were invaluable. They realised that to get the man better in the shortest possible time their kindness had to be accompanied by firmness and they had to be just in their distribution of interest and attention. Sometimes it proved helpful to have the sister present at the beginning of the hypnosis, narcosis and convulsion therapy, thus increasing for the patient the atmosphere of security. Every morning patients were discussed with the sister; progress or otherwise was noted and an outline of the treatment indicated. This demands from the nurse high qualities of discretion, insight and understanding.

The atmosphere of the ward must be one of recovery. Any patient who will not respond to treatment and requires invaliding should have his medical board elsewhere. I feel strongly that medical boarding in a psychiatric hospital has a hampering effect on successful treatment; the men talk about it and their urge to escape is increased. The situation is similar with conversion hysterics. This contagious disease requires isolation, as advocated by Kretschmer; such patients then often find it not worth while to retain their symptoms. It is absolutely essential that the physician should see and be seen by every patient at least once a day, preferably twice. The ward round is a powerful therapeutic weapon; with the sister in attendance he speaks to each patient individually and gives him a chance of saying how he feels. We were fortunate in having our 48-bed wards divided into sections of 12 in charge of a reliable patient NCO. This seems to be the ideal group number, larger numbers failing to produce a truly corporate atmosphere. It was often noted during the ward round that if one man was full of hypochondriacal complaints the next two or three were apt to imitate him. Firm reassurance checked this tendency, and benevolent and friendly ridicule—a "Father O'Flynn" attitude—inculcated a healthy sense of humour. During the round patients whose mental state had altered and required an interview that day were noted. A definite date for the patient's discharge should be given if at all possible; it accelerates recovery in most cases, though in some it aggravates the symptoms and indicates the need for further treatment. If the date is overlooked and discharge does not take place there is a tendency to relapse.

At regular intervals the groups of 12, excluding those who might be harmed by public therapy, met the psychotherapist. By this time each man's background was known. The session began with an explanation of fear reactions of present and past origin. Hypothetical situations were outlined fitting in with many of their personal histories. Next came a short résumé of essential factors affecting morale and war aims. The men were encouraged to comment, and one was amazed to find how little group sense they had. Their preoccupations were with their own security, but later in treatment the strengthening of group ties could be achieved to replace this. Outside the ward patients were invited to attend lectures and discussions open to all troops in the neighbourhood. In the discussions the disgruntled "barrack-room lawyer" type was prominent. These discussions revealed the need for social security and its predominance in the men's minds. The publication of the Beveridge report was timely.

One of our chaplains was particularly helpful in group therapy; his office being less authoritarian, he reached problems occasionally concealed from the therapist. He was an excellent athlete and extremely popular as an organiser of inter-group games.

After the ward round every patient up and about went off at regular hours to his daily job in the camp. If the man was allowed to hang about brooding he was less responsive to therapy and made poor progress. Rigid routine helped as an antidote to the turmoil of conflicting emotions. Each man was asked on admission his peace-time occupation and his hobbies. He then had a choice of some 20 occupations in the camp or in the workshops.

The success of occupational therapy depends not so much on materials and equipment as on the therapist in charge. He may fail to understand the intention, though an excellent craftsman. If he derides the efforts of the patients he will increase their sense of failure, but when the occupational therapist is an encouraging teacher an excellent atmosphere is secured. The workshops were busy with a sense of achievement. The articles made were used in the ward so that the men could see them in daily use, which gave them a sense of contributing to the welfare of the community.

Each patient was interviewed at least once a week, and more often when having intensive therapy. He had to become aware of the pattern of reaction leading to his illness, of the parallel between the precipitating environment and previous situations extending back to childhood.

Since the aim was to have the man fit for duty within 3 weeks, analysis where used had to be direct and not diffuse. Dream material, of which there was plenty, was the quickest approach. Hypnosis, chemical or ordinary, was useful for removing symptoms but not so valuable for securing insight for the patient as for the psychiatrist. Some patients required only a few hours' therapy to render them symptom-free and to ensure for them a degree of awareness of their previous false adaptation to their environment. Escapist tendencies were early checked. It was pointed out that lack of ships made it necessary for them to remain in the Command and return to duty. The treatment was decidedly eclectic: approaches of most schools of therapy were used. In a few cases interpretation or removal of conversion symptoms over-

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reached the power of the patient to assimilate. A short period of sleep narcosis rendered him able to carry on with the analysis. At all times it was borne in mind that the aim was adaptation to warfare and not a radical change of personality.

Conditioning to warfare noises is used in battle schools; we were able to use only a modified form, through a loud-speaker, recorded from air-raids. The patient's anxiety was revived and could be dealt with. Some patients affected an absence of fear reaction during the noises and these were even more in need of treatment.

PHILOSOPHIC VALUES IN MORALE

Slater (1943), discussing treatment of war neurotics, was at pains to explain away the greater frequency of return to duty of men who had philosophic or religious values in their lives. Of these he returned 32·8% more than the average. He says that this was due "to a greater frequency among them of a type of personality that takes religion, and probably also personal and social duties, more seriously than the average man, and is perhaps more imbued with a degree of conscientiousness and dourness of personality." Surely for many men he is putting the cart before the horse, for even if some religion is neurotic its mass neurosis often cures individual neurosis. The religious factor in human personality exists and must be taken into account. In our group discussions on morale this question was often brought up by those with separation anxiety and was answered in St. Paul's spirit of *Quis separabit*.

Discussion

Few of the 1000 cases which were treated by psychotherapy belong to the category of war neurotics who could be adequately dealt with in a psychiatric CCS. During the retreat to El Alamein 600 cases of more superficial neurosis were treated in the psychiatric wards of an advance base hospital and most of these were returned to duty after rest, sedation and reassurance. Only at the height of a battle were cases received within 4 days of becoming casualties; the others had gone through the filter of ordinary medical wards in other base hospitals. At least three-quarters of those could have been treated after assessment by explanation and reassurance. Where specialist help is required is in assessing the nature and degree of the severity of the illness.

Successful psychiatric treatment depends on an understanding of the pattern of reaction the patient produces to danger. In my experience the psychosomatic illness is based on a deep-seated separation anxiety following a threat to life, Slater (1943) mentions as the first cause of neurotic breakdown in the soldier "separation from home and family" and as the first predisposing cause quotes "bad home environment and bad relationship with the father"—and I would add, with the mother. An understanding environment has to be staged in the hospital in which the patient can be rapidly reconditioned and the threat to his emotional security assuaged. He is assisted in this environment to resolve long-standing conflicts which have given rise to his sense of insecurity. His need for security is met, the gaps in the foundations of his early emotional life are filled in, and with this debit of childhood clear, he is now more willing to face current dangers and take his chance with his fellows.

No illusions are held about the possibility of these men breaking down again, but it is felt that they were salvaged for a useful term of service at a time when there was an acute shortage of man-power. The average stay of the cases treated by psychotherapy was 18·1 days. A similar method of intensive therapy might be used in peace-time in neurosis wings of general hospitals.

Summary

A brief outline is given of 2500 psychosomatic casualties in the Middle East during 1942.

A more detailed description of 1000 cases of anxiety neurosis and hysteria is given. Of these cases a quarter had had prewar neurosis; 89·9% were returned to duty (58·6% to full duty, 31·3% to base duty) and 5·4% were invalided. Average stay in hospital 18·1 days.

Cases were selected for treatment by grouping them into three classes.

The needs are stressed for the nurse with psychological understanding, the speedy removal of untreatable cases, the staging of a suitable ward environment coupled with rapid reconditioning and the full-time employment of all patients who are up.

Hospitals in peace-time might adapt a considerable number of neurotic patients to employment by similar methods.

My thanks are due to Brigadier G. W. B. James, MC, for his helpful advice and criticism and for his lead in short therapy; to Colonel W. Hogarth Kerr, TD, for permission to use his efficient records room; and to Lieut.-Colonel W. H. de B. Hubert, who was always an understanding and encouraging chief.

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TRIFIN NAIL AND PLATE FOR PERTROCHANTERIC FRACTURES

G. K. McKEE, FRCS
ASSISTANT ORTHOPÆDIC SURGEON TO NORFOLK AND NORWICH HOSPITAL

ALL fractures in the region of the upper end of the femur have many points of similarity, yet though internal fixation has been established as a sound method of treating the transcervical variety it has not been as widely applied to pertrochanteric and subtrochanteric fractures; this lower type of fracture presents a mechanical problem which is not satisfactorily solved by the simple insertion of a trifin nail.

In pertrochanteric fractures the line of fracture is always much lower posteriorly than anteriorly, and in fact from the point of view of treatment they are mostly similar to a subtrochanteric fracture. This renders the lower fragment difficult to hold, because as the bone of the lateral femoral cortex rapidly increases in thickness below the trochanteric region it is particularly liable to split into the line of the fracture posteriorly, when an attempt is made to insert a nail. A plate, which would be fixed to the head of the nail and screwed into the lateral aspect of the shaft of the femur, seems to be a simple answer to the problem. Such a method has no doubt been in use in several clinics for years, the actual type of plate varying to a large extent and probably being relatively unimportant. In this series of 17 cases this form of treatment has been surprisingly successful as a means of fixation, and although the operative technique is slightly more difficult than the simple insertion of a nail, the degree of fixation and the ultimate results seem to be superior to those obtained by internal fixation of the intracapsular type of fracture.

THE PLATE USED

Jewett (1941) used a Smith-Petersen nail in combination with a flanged plate for five cases and subsequently introduced a one-piece angle nail for trochanteric fractures. A one-piece angle nail is, however, more difficult to insert, and from the results of this series appears to be unnecessary, for there has been no tendency for rotation to occur at the site of junction of the plate and nail as might happen by the loosening of the coaptation screw, since the box spanner has been used in addition to the screw-driver in order to tighten the screw sufficiently; moreover, the main rotation strain in these fractures is in the axis of the shaft and not in the axis of the neck of the femur. The plate and nail also seem adequate to resist adduction, the other form of displacement common in these fractures, so long as there has not been excessive comminution.

The plate (fig. 1*a* and *b*) consists of a piece of 12 gauge, highly polished stainless steel 3½ in. long and 1 in. broad and curved to fit the lateral aspect of the femur. This portion has 4 staggered screw holes in it, by which it can be fixed to the lateral cortex of the femur. At the upper end is a small flange 1 in. x ½ in. set at an angle of about 120°, in which is a single hole for attachment to the head of the Smith-Petersen nail by a special coaptation screw. The angle of 120° between the plate and the flange can be readily altered by a pair of plate benders, so that the exact angle required can be adjusted at the time of operation. A screw is used for fixing the nail and plate together, called the coaptation screw, and it is tightened by a screw-driver. In two of the earlier cases

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it was noticed in the X rays that this screw had become loose and it was tightened with a screw-driver inserted through a small skin incision. Lately a special screw-driver has been used which will pick up and hold the small screw and it is finally tightened by a special box spanner. A three-flanged cannulated nail with a female screw in the head to take the thread of the coaptation screw is used and should be of the same stainless steel as is used for the plate and screws. In some of the earlier cases a bifin nail was used and inserted through a special saw cut, but this has been found to be unnecessary and a trifin nail is more satisfactory.

OPERATIVE TECHNIQUE

Any method for driving in a Smith-Petersen trifin nail may be used. The nail should be as vertical as possible (fig. 2); this makes for stability in both pertrochanteric and transcervical fractures, because it converts the shearing force of weight-bearing into an impacting one. The threading of a cannulated Smith-Petersen nail over a correctly placed guide has been carried out in this series by the method first described by Brittain (1938), but the use of an Engel-May (1938) or Patrick (1941) director or any other method would depend on the individual practice of the surgeon. Brittain's method does enable the nail to be inserted through a very small incision, an important point in old people, the incision being enlarged later for the insertion of the plate after a satisfactory position for the nail has been obtained. This procedure reduces the shock of operation, as a large bleeding wound is avoided until the last stage. The lateral femoral cortex is often very thick, especially in men, and in such cases, before inserting the nail, it may be thinned by shaving off at the selected site with a broad gouge. Even so the insertion of the nail may crack the lateral cortex into the fracture line. Previous to the use of the plate such an occurrence would mean abandoning the operation, but with the flanged plate it need cause no anxiety as the nail is only required to secure the upper fragment, and the plate can be relied on to obtain an adequate hold on the lower fragment.

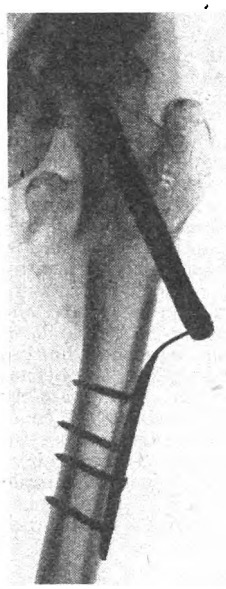


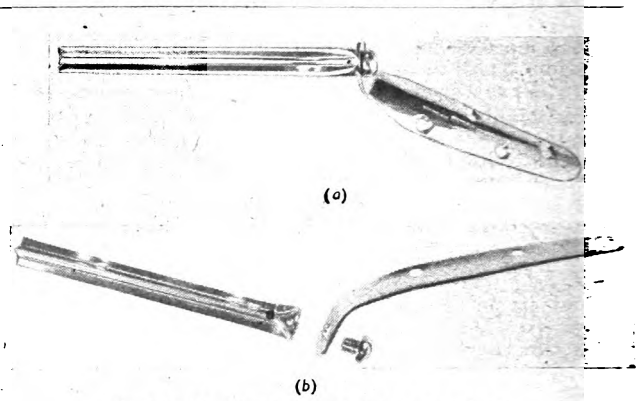
Fig. 2—X ray of a pertrochanteric fracture treated with a trifin nail and plate.

For the application of the plate the incision is enlarged vertically downward and deepened through the iliotibial tract of the fascia lata and the vastus externus muscle to the lateral aspect of the femoral shaft. Spike retractors are used so as to expose the bone and also to lessen the bleeding. The plate is taken and laid on the femoral cortex and adjusted with plate benders so that the small upper flange is set at the correct angle for attachment to the head of the nail. The coaptation screw is now inserted and tightened with a spanner and 1¼–1½ in. screws are used to fix the plate to the femoral cortex. In this way a complete fixation of the fracture is obtained. The vastus externus muscle is sutured with interrupted sutures of No. 35 gauge stainless steel wire, and the ilio-tibial tract is then sutured. Finally the skin edges are approximated by a continuous suture using the same material.

POSTOPERATIVE TREATMENT

The more secure hold obtained by the nail and plate compared with the nail alone has encouraged us to get these patients up earlier, and the length of stay in bed has been reduced from 6 weeks (as for a transcervical fracture) to 3 weeks. In the exceptional case where there has been excessive comminution at the site of fracture (1 case in this series of 17), this period of recumbency will have to be longer.

Active exercises for the leg are started the day after operation but voluntary movements are often a little delayed in comparison with the fracture of the neck of the femur, a fact no doubt due to the more extensive incision in the muscles of the thigh. After 3 weeks the patients are instructed to walk with crutches, and this partial weight-bearing is continued for 12 weeks at least, when a further X ray is taken; if there is evidence of union weight-bearing with two sticks for a further 4 weeks is recommended. If this after-treatment is adopted there does not seem to be any tendency to adduction deformity, provided that the operation was mechanically sound. No additional fixation, such as a plaster-of-paris spica, is required. Slow union and aseptic necrosis is, of course, not found in this type of fracture.



(a)

(b)

Fig. 1 (a, b)—The plate, coaptation screw and nail.

RESULTS

During 6 consecutive months, 17 cases of pertrochanteric fractures of the femur have been treated by the application of a nail and plate. There were 5 deaths, but only one was due to postoperative shock. One was from fat embolism, one from uræmia aggravated by pre-existing prostatic enlargement, one from hypostatic pneumonia 12 days later, and one from pulmonary embolism 3 weeks later. This is a high mortality, but the age, condition and fate of these patients without operation must be taken into consideration. The ages of the 5 patients who died were 78, 76, 80, 83 and 77 years. The average age of the whole series was 70. There were only 3 cases under 60 and there were 4 over 80.

There was one failure as far as the operation was concerned and in this case the upper fragment was comminuted so that the nail would not hold. A certain amount of collapse took place at the fracture site, and the nail travelled through the head into the hip-joint. A mild infection also developed in this case. Extreme comminution of the head or shaft is unusual—1 case in 17. It makes fixation of the fracture more difficult to secure and may in some cases be a contra-indication to the method; it has been met with in one case since this series was analysed.

In order to fix the plate to the nail, the head of the nail must project 2 cm. or so from the lateral cortex of the femur, but so far this has not given rise to any trouble except some local tenderness on pressure or on lying on the affected side. The projection is somewhat lower down the shaft of the femur, as a rule, than in the case of a nail for an intracapsular fracture, and consequently is better covered by muscle. The other 11 cases were extremely satisfactory as regards maintenance of position, return of function and union. They were all enabled to walk again and were freer from late complications than intracapsular fractures. This would be expected, for extracapsular fractures are not liable to aseptic necrosis and non-union however treated. They are, however, liable to adduction deformity, loss of joint function (especially of the knee-joint) and bed sores, and internal mechanical fixation prevents these undesirable features and considerably improves the life of these old people.

OTHER USES

The combination of the nail and flanged plate can be used for an arthrodesis of the hip.

A woman, aged 51, suffered from an old slipped epiphysis for 38 years and the hip became very arthritic, so that latterly her symptoms were becoming increasingly severe. Then she

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had a fall and fractured the bone through a line passing through the greater trochanter. The old-standing adduction and external rotation deformities were corrected to a large extent on the orthopædic table; then the trifin nail was inserted across the joint line to arthrodese the hip, and the plate applied below the fracture. After 6 weeks this patient was walking better than she had done for several years because her leg had been made relatively longer, and her symptoms have become insignificant.

The flanged plate was used in addition to the trifin nail in this case because there was an associated fracture, but for fixation of the joint in a case of osteo-arthritis without an associated fracture the combination has two big advantages over the nail alone—it prevents the nail from slipping out, and it is a safeguard against the occurrence of a subtrochanteric fracture of the femur, a complication which has an unpleasant habit of developing in the convalescent period if the trifin arthrodesis nail is used alone. The fragments of the femur can also be held by the combination of a nail and plate after a subtrochanteric osteotomy. In this way the angle can be exactly controlled and a plaster hip-spica avoided.

SUMMARY

Various methods of internal mechanical fixation for these pertrochanteric fractures of the femur have been used in the past 7 years, but a combination of a trifin nail and flanged plate is the most satisfactory so far.

Sufficient time has not yet elapsed for the end-results of all these cases to be recorded, but they appear to be more satisfactory than the transcervical fractures. This would be expected since the operation is mechanically a much sounder method of fixation than the nail alone, and the extracapsular fracture is much better at uniting than the intracapsular type.

I should like to thank Mr. A. R. Hodgson, orthopædic registrar at the Norfolk and Norwich Hospital, for his help with these patients, and Mr. Drew of Down Bros. Ltd., for his coöperation in the manufacture of the plate.

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HÆMOLYTIC DISEASE IN THE NEWBORN

THE RH FACTOR

F. A. LANGLEY
M SC, M B MANC
DEPARTMENT OF PATHOLOGY, UNIVERSITY OF MANCHESTER

F. STRATTON
M B MANC, D P H
ASST REGIONAL TRANSFUSION OFFICER, EMS, ROYAL INFIRMARY

IN 1933 Parsons, Hawksley and Gittins reviewed the position of the group of diseases in the newborn characterised by erythroblastosis (i.e. anæmia, normoblasts in the peripheral blood, and extramedullary hæmopoiesis). They showed that there were three variants: (1) hydrops fœtalis; (2) icterus gravis; (3) anæmia without either (1) or (2). They concluded that a hæmolytic process was at work but they were unable to identify it. The clue was provided by the discovery of the Rh factor by Landsteiner and Wiener (1940) and the demonstration that a fœtus whose blood was Rh-positive would produce in an Rh-negative mother Rh antibodies that were capable of passing the placental barrier and so causing hæmolysis of the fœtal red cells. There is now a considerable body of literature on the serology of the subject (Boorman et al. 1942, Levine et al. 1941, Wiener 1942, Potter et al. 1943) but some of it describes serological findings in specimens for which the diagnosis was made elsewhere. We have had the opportunity of correlating the clinical, pathological and serological findings in a group of cases most of which have been under our own observation throughout.

MATERIAL AND RESULTS

We examined 19 infants with hæmolytic disease and 2 with congenital hydrops; as controls 41 cases of physiological jaundice were examined (table I). In each case the blood from the mother was tested for the Rh factor and the anti-Rh agglutinin by the technique described below; the breast-milk of 10 mothers was examined and in 7 cases an anti-Rh agglutinin was found; 12 necropsies were performed on infants dying of hæmolytic disease.

CLINICAL FEATURES

Of our group of 19 cases of hæmolytic disease jaundice was the presenting feature in 14, severe anæmia in 3 and hydrops in 2. The most important single clinical feature in these cases was a progressive fall in the hæmoglobin level below that normally expected. This fall was sometimes rapid and associated with jaundice. On the other hand it was sometimes slower but differed from that of a nutritional anæmia in failing to respond to iron or liver therapy. In 3 of our cases the infants were extremely pale, one being described by the mother as being a beautiful child "like a lily."

While erythroblastæmia is a common and important finding in hæmolytic disease of the newborn, it was initially absent in 5 of our cases but appeared later in 3 of them. Clinically detectable enlargement of the liver and spleen was found only once in this series.

The family history often shows a sequence of abortions and stillbirths. The first child is often unaffected and in 18 families 13 have had healthy first-born children. In the other 5 families in which the first-born child died, one was stillborn, two were jaundiced and one pale at birth, the other had hydrops. Of the unaffected first-born children 7 were Rh-positive, the others were not available for examination.

PATHOLOGICAL FEATURES

The cases examined at necropsy fall into two classes:

1. The 11 cases showing ectopic hæmopoiesis.
2. The case showing no ectopic hæmopoiesis (case 12).

When extramedullary hæmopoiesis was present it was most evident in the liver but a few foci were occasionally found in other organs such as the thymus, kidney and spleen. The hæmopoiesis in the liver in some cases consisted of a diffuse infiltration of the sinusoids by erythropoietic cells; in others the erythropoietic cells were arranged in compact foci. The appearances closely resembled those found in fœtal livers. A comparison was made with the livers of 28 infants dying in the first six months of life; 8 of the 11 infants in this control series who died in the first week of life showed hepatic hæmopoiesis but this was much less in degree than that found in the 11 cases of hæmolytic disease.

Of the infants reported in table I, 4 died of cerebral hæmorrhage. One of these infants (case 19) who died within the first 24 hours with a hæmorrhage into the cerebellum, and whose liver contained ectopic hæmopoietic foci, was mildly jaundiced but was not obviously anæmic; in this case a diagnosis of erythroblastosis fœtalis could neither be made nor excluded either clinically or pathologically. The mother's blood was examined and found to be Rh-negative but there was no anti-Rh agglutinin present. However, in view of the fact that the mother's blood was not examined until several months after the birth of the child, any agglutinin originally present may have disappeared.

Case 12 differed from the other 11 in that there was no ectopic hæmopoiesis in the liver or spleen. The renal tubules were plugged by granular eosinophilic material similar to that found during the excretion of hæmoglobin with an acid urine after a transfusion with incompatible blood. In this case, although the infant had been transfused, the blood given was Rh-negative and compatible by cross-matching tests. We were unable to obtain a specimen of urine to test for excretion of hæmoglobin. If it be taken that the blood was not incompatible it is clear that some other factor must have been causing hæmolysis so rapidly that hæmoglobin was excreted. In this case no circulating anti-Rh agglutinin could be found in the infant's blood. Whereas the spleens in the other 11 cases coming to necropsy had a loose pulp which often contained a few foci of hæmopoiesis, in case 12 the splenic pulp contained many fairly large irregular areas packed with red cells and the intervening areas were filled with closely packed oval and spindle cells.

ILLUSTRATIVE CASE-HISTORIES

CASE 1.—A woman aged 22, having one healthy child aged 2 $\frac{1}{2}$ years, was admitted to hospital because of anæmia and œdema 3 weeks before parturition. Blood-pressure

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110/60 mm. Hg. Urine normal. Two weeks before delivery the patient received a transfusion of citrated stored blood (group O, Rh-positive; serum titres: anti-A 128, anti-B 16), but after about 150 c.cm. had been given she had a severe rigor and the temperature rose to 104° F. The transfusion was stopped and the temperature fell in a few hours; no subsequent collapse, hæmaturia or jaundice. Iron was given and the hæmoglobin was 60% at term. The mother was then delivered of a full-term fœtus, weighing 7 lb. 3 oz. The child was slightly jaundiced at birth, but this rapidly cleared, and 3 days later it was noticed that the child was very pale. Beginning on the third day, intramuscular blood, 5–10 c.cm., was given twice daily, some from the mother, some from the father, and some from various other donors. On the fifth day a blood-count showed: red cells, 1,250,000; Hb., 25%; white cells, 16,000. No nucleated red cells were seen. The child died on the sixth day. The mother's blood (group B, Rh-negative) examined 7 days after parturition showed an anti-Rh agglutinin with a titre of 4096 at 37° C.; 3½ weeks later this had fallen to 1024 at 37° C. and 5 months later was 256. The healthy first child was group B, Rh-positive.

Necropsy.—A well-nourished infant with extreme pallor but no obvious sign of jaundice. The liver was enlarged (210 grammes) to twice its normal size, and pale; biliary system healthy. Spleen enlarged (27 g.) to more than twice normal, semifluid and chocolate-brown. There were a few hæmorrhages in the cortex of the right kidney. On each side of the brain in the lower parietal regions were a number of scattered hæmorrhages. No enlargement of lymph-glands; the marrow appeared normal. The prussian-blue reaction was strongly positive in the liver and kidneys. No other significant naked-eye changes were observed.

Microscopically the general architecture of the liver was well preserved. The cytoplasm of the cells was granular, in some places vacuolated. There was loose infiltration of hæmopoietic cells round the portal tracts, and in the sinusoids where denser infiltration sometimes formed foci; there was some evidence of hæmopoiesis beneath Glisson's capsule. In the portal tracts the infiltration consisted of some large cells with vesicular nuclei and pale basophilic cytoplasm, there were eosinophilic myelocytes and polymorphs, lymphocytes and hæmoglobinated normoblasts. In the sinusoids and in the bays off them or in lacunæ in the liver cells were large cells with nuclei about the same size as those of liver cells and with pale basophilic cytoplasm. These were either hæmocytoblasts or early primary erythroblasts and were not numerous. A larger number of later erythroblasts, smaller cells with denser nuclei, were present. Few of the nucleated cells contained hæmoglobin. Mitoses were seen in some of the few basophilic normoblasts. Eosinophilic myelocytes were moderately numerous in the sinusoids. There was much free iron in the liver cells.

In the spleen the malpighian bodies were difficult to define. The pulp was loose and contained a number of foci of hæmopoiesis similar to that present in the liver sinusoids, and there was much intracellular iron pigment. The marrow was very active, leucopoiesis and erythropoiesis being intense. There were a few hæmopoietic foci in the thymus. The kidneys and other organs showed no significant changes.

CASE 12.—The child was born a good colour but became jaundiced after 12 hours, and on the second day was intensely jaundiced. Third day: red cells, 2,325,000; Hb., 40%; white cells, 24,000; nucleated red cells, 35 per 100 white cells. Rh-negative blood, group A, 45 c.cm., given intravenously. Fourth day: red cells, 2,550,000; Hb., 65%. Fifth day: red cells, 2,312,000; Hb., 40%. Rh-negative blood, 65 c.cm., intravenously. Eighth day: red cells, 1,925,000; Hb., 40%. Rh-negative blood, 65 c.cm., intravenously. Nucleated red cells, 8 per 100 white cells. Ninth day: 16 c.cm. of blood given intramuscularly. Tenth day: child died.

The child was fed on heated breast-milk. The first child in the family had lived 4 days, jaundiced at birth. The second child, aged 2 years 9 months, was jaundiced some days after birth, treated by transfusion and recovered; group A, Rh-positive. The third child, aged 1½ years, was normal at birth; group A, Rh-negative. The fourth (this case) was group A, Rh-positive. The mother was group A, Rh-negative; her serum contained an anti-Rh agglutinin with a titre 32–64 with various cells at 37° C. Breast-milk showed the anti-Rh agglutinin present until the seventh day. The child's serum examined on the second day showed no atypical agglutinin.

At *necropsy* the rather small but well-developed infant showed a generalised deep jaundice, including the viscera. The liver (175 g.) was almost twice its normal size, intensely bile-stained and with a pale lobular pattern; biliary system normal. The spleen (18 g.) was almost twice its normal size and slightly softer than usual.

On *microscopy* the liver cells were rather granular; no significant hæmopoiesis. The architecture of the spleen was grossly disturbed; few lymphoid follicles present. The pulp contained many fairly large irregular areas packed with red cells. The intervening areas were pale in contrast, and filled with oval and spindle cells. Van Gieson's stain showed no increase in collagen but silver preparations showed a slight increase in reticulin fibrils. There was no hæmopoiesis. Some of the kidney tubules were dilated and in some of the convoluted and collecting tubules there were orange-red amorphous casts similar to those found in kidneys after incompatible transfusions and crushing injuries; no evidence of hæmopoiesis. The bone-marrow showed no gross abnormality, the erythropoiesis being normoblastic. The other organs showed no significant changes except for a small area of bronchopneumonia at the apex of the right lung.

CASE 24.—The baby became mildly jaundiced on the third day. There was no pallor and the jaundice improved and on the sixth day had almost disappeared. A diagnosis of "physiological" jaundice was tentatively made. However, since an anti-Rh agglutinin was found in the mother's serum the child was kept in hospital. Seventh day: red cells, 4,900,000; Hb., 110%; white cells, 5600; one nucleated red cell per 100 leucocytes. Fifteenth day: red cells, 3,775,000; Hb. 100%. Nineteenth day: red cells, 3,287,000; Hb., 90%; one nucleated red cell per 100 white cells. Rh-positive citrated whole blood, 65 c.cm., given intravenously. Twenty-first day: red cells, 3,687,500; Hb., 95%. Five weeks after birth the blood-count was: red cells, 2,837,000; Hb., 65%. Intramuscular blood was given without much effect. The blood-count improved but unfortunately convalescence was interrupted by bronchitis. The child received adequate doses of iron from its first day of admission to hospital.

The first child in the family is now aged 3 years, and was healthy at birth; group A, Rh-negative. The second child, aged 1 year 9 months, was 2 months premature, but healthy at birth and has remained so; group O, Rh-positive. The third child (this case) was group A, Rh-positive. The father was group O, Rh-positive; and the mother group A, Rh-negative with anti-Rh agglutinin present in serum with a titre of 32 at 37° C. Breast-milk contained the agglutinin for 14 days after birth of this child.

GROUPING FOR FACTORS A AND B

Grouping was undertaken with the usual sera except in the case of newborn infants; in these the blood was examined with anti-A and anti-B immune rabbit sera which we consider to be very much more satisfactory than even high titre human sera. By this means we have detected group A_2B in newborn infants. The tube method of Taylor et al. (1942a) was employed.

GROUPING CELLS FOR FACTOR RH

Here human sera were used and although 3 only were used for routine work, 5 were employed for cases described herein. In this method it is important that several human anti-Rh sera should be used as occasionally a serum may fail to react with a sample of Rh-positive cells. A standard anti-Rh serum of Wiener (1942)—that is, one giving 85% of positive results in a long series of tests—should be included if possible; such a serum was obtained from case 1 of this series.

When human sera are used for typing cells, the anti-A and anti-B agglutinins limit the number of types of blood that can be examined. Wiener (1942) suggested that salival preparations from "secretor" persons containing A and B specific substances should be added to absorb the corresponding agglutinin and make the sera "universal." Universal sera prepared in this way have been used throughout this investigation in addition to the untreated ones.

Technique.—Tubes of 6 mm. internal diameter were used and one volume (0·04 c.cm.) of serum and one volume of 2% cell suspension of whole blood in saline were mixed. The serum was used as 1/1, 1/2, 1/4, 1/8, 1/16, 1/32 dilution because of zoning possibilities (Taylor et al. 1942b). Not greater than 3% cell suspension should be used or the visual reading of the result becomes difficult. Three sets of tubes are incubated at 37° C., 20° C. and 4° C. for two hours.

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TABLE I

Case	Diagnosis	Maternal blood		Group of child's blood	Group of father's blood*	Time between examination of maternal blood and birth of affected child	Necropsy
		Group	Atypical agglutinins				
1–14	Hæmolytic disease	Rh-neg.	Anti-Rh	10 Rh-pos	1 Rh-pos.	Under 10 days	8†
15	Ditto	Rh-neg.	Nil	Rh-pos.	..	Under 10 days	..
16	Ditto	Rh-neg.	Anti-Rh	..	..	7 months	1
17	Ditto	Rh-neg.	Anti-Rh	..	..	11 years	..
18	Ditto	Rh-neg.	Anti-Rh	..	Rh-pos.	4 years	1
19	Doubtful erythroblastosis fœtalis	Rh-neg.	Nil	..	..	8 months	1
20	Doubtful hæmolytic disease	Rh-neg.	Anti-Rh	..	..	9 months	..
21	Hæmolytic disease	Rh-pos.	Non-active at 37° C.	..	Rh-pos.	10 months	1
22–23	Congenital hydrops	Rh-neg.	Anti-Rh	..	1 Rh-pos.	Under 10 days	..
24–64	Physiological jaundice	36 Rh-pos. 5 Rh-neg.	Nil 1 anti-Rh	..	..	Under 10 days	1 1‡
65	Jaundice in congenital heart disease	Rh-neg.	Nil	..	..	Under 10 days	1

* Father's group given only where child's group unknown. † Case of twin pregnancy, both affected. ‡ Premature infant.

Rh-positive and Rh-negative controls were included in each test. The sediment at the base of the tube was examined with the aid of a lens as recommended by Landsteiner and Wiener (1941). While we were able definitely to recognise certain appearances as indicating a positive reaction, we were unable, by this means alone, to recognise a positive or negative result in all cases. Each doubtful tube was therefore further examined by introducing a wide-bore Pasteur pipette down to the bottom of the tube, totally removing the contents without attempting to mix them, gently ejecting the contents in the form of a large drop on to a slide and making a film using the edge of the pipette and relying on the capillary attraction between the pipette edge and slide for spreading out the droplet of tube contents. The film was examined microscopically while the cell-clumps were moving across the field. Two types of clumps were seen: large almost circular ones shedding cells as they moved, which gave them a comet-like appearance; and irregular cell-clumps moving in a fixed mass. The former type of clumping results from the careful removal of the cell deposit from the tube which preserves the cell-groups; only the latter fixed cell-clumps are evidence of agglutination.

TESTING SERUM FOR ATYPICAL AGGLUTININS

The serum is examined as described except that standard cells are used with an unknown serum which should first be inactivated at 56° C. for 20 minutes (Wiener 1942); in addition, all results should be read microscopically. Each serum in serial dilutions is first tested against 5 samples of standard O Rh-positive cells, and 3 samples of standard O Rh-negative cells, at 37° C., 20° C. and 4° C, the cells being freshly obtained from members of the laboratory staff. The patient's own cells and serum are of course put up together each time. If the patient's serum agglutinates all or most of the Rh-positive ones it probably contains an anti-Rh agglutinin. We think, however, that it is important to confirm this by comparing the serum's reaction in a larger number of cell samples with a standard anti-Rh serum. In our cases the titre of the agglutinin varied from 1–2 to 512–1024 at 37° C. (except case 1 above, titre 4096), at which temperature in all cases the titre was maximal. The agglutinins may be very weak and difficult to detect, and numerous factors affect the intensity of agglutination (among these are temperature of the test, whether raw or inactivated serum is used, the occurrence of zoning with certain sera and the fact that the cell-clumps readily break up) so that careful examination of the cell deposits in the test-tubes is important.

ANTI-RH AGGLUTININ IN BREAST-MILK

Witebsky et al. (1942) showed in one case that the anti-Rh agglutinin could occur in breast-milk. In 10 cases in our series breast-milk was examined (table II) and in 7 the anti-Rh agglutinin was present. The milk was examined within 7 days of delivery except in case 5 in which it was not examined until 3 weeks after birth. In one case in which the milk was available for repeated examination the anti-Rh agglutinin was present up to the 14th day. The agglutinin disappears if the milk is brought to the boil.

DISCUSSION

Our results confirm the findings of previous workers that the presence of an Rh-positive fœtus in an Rh-negative mother with the production of an anti-Rh agglutinin in the maternal blood is the factor that causes the syndrome of hæmolytic disease of the newborn; we have shown that the clinical and pathological findings in most cases are those described by workers who distinguished the disease before the cause was identified.

The diagnosis of hæmolytic disease of the newborn may be difficult or impossible both clinically and pathologically. Many of the clinical signs may be minimal or absent. The blood-count may be initially very low or fall steadily in spite of all treatment short of transfusion. In 14 cases in which the diagnosis was made during life, the blood-count fell below normal limits, as recorded by Mackay (1933), very rapidly or much more slowly and cases falling between the two extremes were seen. As might be expected serological detection has led to the discovery of cases that are clinically or pathologically very mild. There was no close relationship between the titre of anti-Rh agglutinin in the maternal serum and the severity of the disease in the child. It is, however, interesting to note that in 2 cases (2 and 10) in which the maternal agglutinin had a low titre, the disease was severe and the diagnosis was confirmed in both instances at necropsy. In case 10 in which the maternal anti-Rh agglutinin titre was only 1–2, when tested directly against the child's cells (group A, Rh-positive) the child's blood-count fell from 3,250,000 to 1,000,000 red cells per c.mm. in 48 hours. Moreover, in case 15 no atypical agglutinins were detected in the maternal serum; yet there was much infantile blood-destruction and the case was severe. Repeated examinations were made using the child's (group A, Rh-positive) and the father's (group A_1 Rh-positive) erythrocytes as test cells. The mother was group A_1B, Rh-negative. Reid (1943) states that the degree of blood destruction

TABLE II—TITRE AT 37° C. WITH RH-POSITIVE CELLS

Case	Breast-milk	Serum	Case	Breast-milk	Serum
5	0	16	13	2	8
6	1	64	14	2	4
10	0	2	15	0	0
11	64	1024	23	64	512
12	4	64	24	4	32

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in the fœtus depends on the titre of anti-Rh agglutinins and the length of time the fœtus is exposed to such antibodies, whereas Gallagher et al. (1943) state that the presence or absence of demonstrable antibody in the maternal circulation appears to bear no relationship to the severity of the disease in the infant. Our observations confirm the absence of relationship between the titre of maternal agglutinins after birth of the child and the severity of the disease in the infant.

Potter et al. (1943) examined 60 mothers of infants who had erythroblastosis; 54 were Rh-negative but an anti-Rh agglutinin was found in only 10. The examination of the maternal serum was apparently made in many cases several years after the birth of the affected child. The time of examination after delivery probably accounts for this difference, since Boorman, Dodd and Mollison (1942) found 44 out of 46 Rh-negative mothers, examined within a month of delivery, had the anti-Rh agglutinin in their blood. That Rh-positive mothers can give birth to children having erythroblastosis fœtalis has been recorded and we have recently seen a pregnant Rh-positive mother whose previous child was proved pathologically to have had this condition. The combination Rh-negative mother Rh-positive child occurs in 10% of pregnancies, but erythroblastosis fœtalis only 1 in 438 (Javert 1942). This suggests that some additional factor is operative, such as the response to the immunising effect of the fœtal antigens after transplacental passage or the ability of the fœtal antigens to cross the placental barrier.

Boorman, Dodd and Mollison (1942), examining 24 cases of physiological jaundice, found 3 mothers to be Rh-negative and their sera to contain anti-Rh agglutinins. In this series we examined 41 cases of physiological jaundice and in 4 instances there was the combination of Rh-negative mother and Rh-positive child. In only one of these combinations were atypical agglutinins found in the maternal serum. In this case (case 24) the hæmoglobin levels correspond closely to the normal curve of Mackay (1933), and moreover the family history was of no diagnostic help.

Hampson (1929) has advised intramuscular injections of blood in treatment of grave familial jaundice in the newborn. Intravenous blood-transfusions seem to be more satisfactory, and Levine et al. (1941) claim that after Rh-negative transfusions the infant maintains higher blood-counts than after Rh-positive transfusions. Two of our cases were transfused successively with Rh-positive and Rh-negative blood and the rate of elimination, as judged by daily counts, of the Rh-positive blood was definitely greater; in 2 other cases the difference was less great, while in 2 further cases, transfused only with Rh-negative blood, the result was satisfactory in one, but in the other (case 12) the blood-count fell rapidly after each transfusion.

Breast-milk has been shown to contain the atypical agglutinin in 7 of our cases, and the milk was therefore boiled before use to destroy the anti-Rh agglutinin, as it seemed desirable to eliminate any possibility of the child absorbing any atypical antibodies.

Levine has advised that maternity cases requiring transfusion should receive Rh-negative blood, but from a consideration of the number of transfusions given to maternity cases, and the relative scarcity of Rh-negative donors, this does not seem practicable. Rh-negative blood should be given to all mothers who are of this group whether or not their blood contains the atypical agglutinin. Only Rh-negative blood should be used by maternity flying squads, since in emergencies proper typing is impracticable. Panels of Rh-negative donors should be prepared to meet this need, and using human typing sera such a panel has been arranged for the North-West Regional Transfusion Service.

SUMMARY

A group of 21 cases of hæmolytic disease of the newborn has been investigated clinically, pathologically and serologically.

The relation of this condition to the Rh factor has been confirmed and in 19 of 21 cases an anti-Rh agglutinin has been found in the maternal blood.

Of 12 necropsies, 11 showed the characteristic extramedullary hæmopoiesis of hæmolytic disease of the newborn.

The breast-milk of 10 of the mothers was examined and 7 samples were found to contain the anti-Rh agglutinin.

We are indebted to Prof. S. L. Baker and Dr. J. F. Wilkinson for permission to carry out work in their departments and for their interest and advice, also Dr. C. P. Lapage for much helpful assistance and access to case material. We also wish to thank for their assistance and permission to publish cases the medical superintendents, pathologists and staff of Crumpsall, Booth Hall, and Withington Hospitals, Manchester, Hope Hospital, Salford, and Boundary Park Hospital, Oldham; the visiting and resident staff of St. Mary's and the Duchess of York Hospitals, Manchester, and the pathologist at Bolton Royal Infirmary.

Thanks are also due to Dr. G. L. Taylor for typing cells for the factor Rh at the start of our study.

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DIABETOGENIC ACTION OF ALLOXAN

HENRY HUGHES, MB LPOOL
SENIOR DEMONSTRATOR IN ANATOMY

L. L. WARE, PH D LOND
DEMONSTRATOR IN CHEMISTRY

F. G. YOUNG, PH D, D SC LOND
PROFESSOR OF BIOCHEMISTRY IN THE UNIVERSITY OF LONDON

St. Thomas's Hospital Medical School, London

Shaw Dunn and his colleagues (Dunn, Sheehan and McLetchie 1943, Dunn, Duffy et al. 1943, Dunn, Kirkpatrick, et al. 1943, Dunn and McLetchie 1943) have made the important discovery that parenteral administration of the simple substance alloxan may be followed, in rabbits and rats, by complete necrosis of the pancreatic islet tissue, together with a condition of persistent hyperglycæmia and glycosuria in which all the cardinal symptoms of diabetes mellitus may be manifest.

We have completely confirmed these results with respect to pancreatic islet changes in the rat and the rabbit, and have also confirmed the demonstration (Dunn, Duffy, et al. 1943) of a persistently diabetic condition in rabbits receiving a single intravenous injection of alloxan. Induction of alloxan diabetes in the rabbit has likewise been confirmed by Bailey and Bailey (1943). We wish also to record experiments made in attempts to elucidate the mechanism whereby an intravenous injection of alloxan may, as first observed by Jacobs (1937), bring about a profound fall in blood-sugar, which is succeeded by hyperglycæmia if the animal is allowed to survive.

EFFECT OF ALLOXAN ON ISLET TISSUE IN THE RAT

Shaw Dunn and his colleagues observed changes in the islet tissue of rabbits within an hour of the intravenous administration of 200 mg./kg. of alloxan. We have seen some changes within 5 minutes of the subcutaneous injection of 300 mg./kg. in the rat. The outlines of some of the β cells become irregular. Small fragments of cytoplasm are cast off from the surface of the cells and lie in the pericapillary tissue. β cells showing diminished granule content seem to be more numerous than in the normal islet.

Animals killed 15 minutes after the administration of the drug show an increase in the extent of the pericapillary spaces. It seems likely that this is due to shrinkage of the cells, but it may be evidence of a transient œdema. Animals killed at longer intervals after the administration of alloxan show no stainable granules in the β cells

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The cytoplasm of these cells appears homogeneous and cloudy and stains a dark grey-blue by Gömöri's method. Many nuclei are pyknotic and many cells are breaking down into an irregular granular mass.

In all the animals examined the α cells, in the main, escape damage. Here and there, however, cells which apparently contain eosinophil granules show changes similar to those in the β cells. The changes noted do not occur in all islets simultaneously. It is the larger islets which are first damaged, and it is the larger islets which, in these experiments, show the greatest damage. Small islets showing little, if any, change can be found even in animals killed 10 hours after administration of alloxan.

With the dose of alloxan employed, we have never observed mitotic figures or other indication of an initial hyperplastic reaction to the drug; nor have we seen any evidence of an initial stimulation of the insulin-secreting mechanism such as is postulated by Shaw Dunn and his colleagues. Nevertheless our histological findings are essentially similar to their published findings.

ALLOXAN DIABETES IN THE RABBIT

Like Shaw Dunn we have succeeded in maintaining the rabbits during the hypoglycæmic phase of the action of alloxan in the fasting rabbit (see figure) by giving glucose solution intravenously to relieve the hypoglycæmia shock; in the survivors a persistent hyperglycæmia and glycosuria has ensued, with the classical symptoms of pancreatic diabetes in the rabbit, as described by Hédon (1893). We have furthermore observed that if the alloxan is administered to a non-fasting rabbit and the animal is allowed plenty of food (cabbage and oats) during the next 12 hours, the fall of blood-sugar is much smaller than in the fasting animal (see figure) and hypoglycæmic convulsions do not occur. Nevertheless the blood-sugar subsequently rises and a diabetic condition develops, as in the animals treated in the fasting state. This shows that the intravenous injection of glucose, which is required to maintain the fasting animals during the hypoglycæmic phase, is not material to the induction of the diabetic condition described by Shaw Dunn and his colleagues.

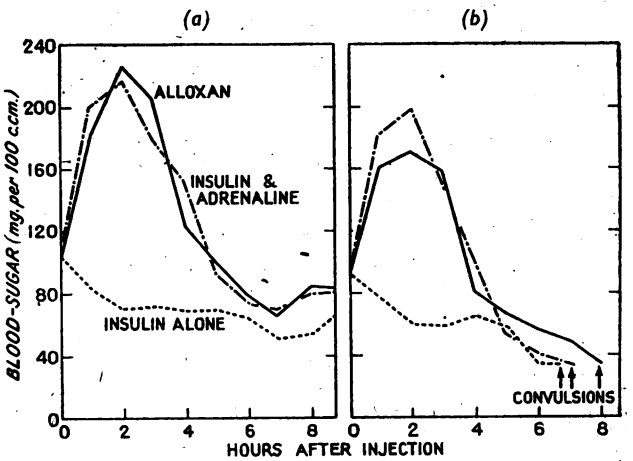
We have observed three rabbits with persistent alloxan diabetes over a period of some months. Despite the maintenance of glycosuria (circa 5–10 g./24 hr.) they ate enough extra food to prevent any progressive emaciation, and after about 20% of the original weight had been lost they were able to maintain a constant body-weight; in this respect they resembled the depancreatised rabbit (Hédon 1893). They also resembled the depancreatised animal in excreting sugar-free urine after a 48-hour fast. Such fasting reduced the usual (non-fasting) blood-sugar level (about 300 mg./100 c.cm) to about 110 mg./100 c.cm.

In one rabbit killed after being diabetic for three months we were able to find no islet tissue at all. This was to be expected from the results of the Scottish workers in acute experiments with rabbits.

HYPOGLYCÆMIC PHASE OF THE RESPONSE TO ALLOXAN IN THE RABBIT

Shaw Dunn and his colleagues suggest that the hypoglycæmic action of alloxan, first observed by Jacobs (1937), might be caused by alloxan stimulating the insulin-secreting mechanism of the islet cells, so that the islet cells ultimately died from overwork. Recalling that the pancreas of a 1 kg. normal rabbit contains about 10 units of extractable insulin (Marks and Young 1940), we have considered the possibility that the hypoglycæmic response is attributable to the slow release of this amount of insulin from dead or dying islet cells. If all the cells do not die for 10–15 hours, pancreatic insulin might be slowly liberated over the whole of this period. With this idea in mind we administered 10 units of protamine-zinc insulin (PZI) to fasting rabbits and observed a fall of blood-sugar level which, after some hours, resembled that resulting from intravenous injection of 200 mg./kg. of alloxan and culminated in convulsions (fig. *b*). When the animal was not fasting at the beginning of the experiments, and was allowed to consume food throughout, the hypoglycæmic effectiveness of 10 units of PZI was diminished by about the same amount as was that of alloxan (fig. *a*).

As Jacobs (1937) and others have noted, the immediate blood-sugar response of the fasting rabbit to intravenous administration of alloxan is a rise to levels between 150 and 250 mg./100 c.cm. The response is similar in the non-fasting rabbit (see figure). The hyperglycæmic phase is followed by a fall which brings the blood-sugar to hypoglycæmic regions about 8 hours after the injection (cf. figure). By giving the rabbit two subcutaneous doses of adrenaline, each of 150 μg., as well as 10 units of PZI, we have succeeded in producing the blood-sugar changes in this animal—fasting or non-fasting—similar to those seen in the 12 hours after intravenous injection of 200 mg./kg. of alloxan (see figure). The first dose of adrenaline was given simultaneously with the insulin, the second an hour later. The initial hyperglycæmia following administration of alloxan to the rabbit may well result from a release of adrenaline in the body, and our results show that even though such a hyperglycæmia is superimposed initially, the hypoglycæmic



effectiveness of 10 units of PZI is largely unimpaired 6 hours or so after its administration.

Although these results are by no means conclusive, they provide evidence in favour of the simplest hypothesis regarding the hypoglycæmic action of alloxan—namely, that it is due to the slow release of preformed insulin from dying islet cells. Until evidence is forthcoming against such a simple hypothesis we prefer to retain it, bearing in mind that there has been no sign of such extensive liver damage as would be needed to produce hypoglycæmia of hepatic origin.

DISCUSSION

Shaw Dunn and his collaborators refer to alloxan as a "possible cause of an initial disturbance of the islets which may eventuate in diabetes." This possibility in no way rests on the validity of the hypothesis that alloxan is a physiologically important stimulant to islet activity in the normal animal, a hypothesis which we would not accept on the basis of the available evidence. Nevertheless it has been stated that alloxan may be present in the urine of human beings under pathological conditions (Liebig 1862, Lang 1866), and if this is true, diabetes mellitus might arise from a derangement of metabolism which gave rise to free alloxan in the body. It is interesting to recall that van de Vyvere (1876) claimed to have found alloxantin in the intestine of a person suffering from oxalic acid poisoning.

A tissue acted upon by a damaging agent might be expected to exhibit a mitotic reaction. Such a reaction in individual islets cells was clearly observed in dogs treated with diabetogenic pituitary preparations (Richardson and Young 1938). The fact that we have seen no such reaction with the amounts of alloxan we have employed may mean that these doses are big enough to prevent any cells from escaping destruction. A mitotic reaction might be expected, however, in response to the less vigorous damaging action of smaller doses.

SUMMARY

1. The observations by Shaw Dunn and his colleagues, that a single injection of alloxan may induce extensive necrosis in the pancreatic islet cells of the rat and of the rabbit, have been confirmed. The subsequent develop-

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ment of persistent glycosuria, and a condition resembling diabetes mellitus, has been confirmed with the rabbit.

2. The hypoglycæmic action of alloxan can be simulated, in the rabbit, by the administration, in the form of protamine-zinc insulin, of that amount of extractable insulin which is known to be present in the pancreas of the normal animal. These and other considerations suggest that the hypoglycæmic action of alloxan results from the liberation of their preformed insulin by necrotic islet cells.

3. Attention is drawn to earlier work on the formation of alloxan in human beings.

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NOTES ON
TYPHUS FEVER IN THE MIDDLE EAST

WILLIAM BROCKBANK
M D CAMB, F R C P
LIEUT.-COLONEL RAMC; OFFICER I/C A MEDICAL DIVISION

S. R. F. WHITTAKER
M B CAMB, M R C P
MAJOR RAMC; MEDICAL SPECIALIST

THE incidence of typhus is high among civilians in many parts of the Middle East, but so far sporadic cases only have occurred among British troops. Since relatively few medical officers have treated louse-borne or "epidemic" typhus fever we record our experience of 10 cases treated at a general hospital in March–May, 1943.

CLINICAL DIAGNOSIS

The patients were all British soldiers but most of them had duties bringing them into close contact with civilian labour. It might be expected that men suffering from louse-borne typhus would give a history of being bitten by lice, or that scratch marks or lice would be found on their bodies or clothes; but we found evidence of lice in only 1 case.

They had usually been ill for 2 to 5 days before being referred to hospital. They complained of headache, pain behind the eyes, pains in the back and limbs, vomiting, shivering or rigor and fever of 101–103° F. These symptoms are also suggestive of most other medical diseases, apart from dysentery, seen in the Middle East, and the provisional diagnosis made by the regimental medical officer was usually "Pyrexia, NYD ? sandfly fever or malaria." There was therefore nothing to suggest to the admitting medical officer the need for special isolation. Of our 10 patients 8 were admitted to general wards and remained there till the rash appeared on the 5th or 6th day of illness.

More familiarity with typhus might have enabled us to pick out these cases earlier; but to the inexperienced eye the clinical features may present no obvious points of differentiation from malaria, sandfly fever, relapsing fever or typhoid. The congested or "bloated" look of the face, with suffusion of the conjunctivæ, was noted in several patients, and in all cases there was considerable tachycardia; but in the absence of an epidemic of typhus these guiding signs are apt to be overlooked.

The characteristic rash appeared in 8 cases on the 5th or 6th day of illness, but in 2 it was delayed until the 10th day. At first bluish-red macules appeared on the sides of the chest, back and shoulders; they might have been mistaken for a profuse typhoid rash but they persisted and soon ceased to fade on pressure. Their colour changed to a deep red and then to brown. Petechiæ and hæmorrhagic points in the centre of some macules were seen in all cases but never a profuse purpuric eruption. The rash faded in about a week, but left a brown staining which could be demonstrated as late as the 4th or 5th week. The arms and legs were usually involved and the face in 2 cases. The rash on the 2nd day was unlike any rash we had seen before, and combined with the general condition of the patients left little doubt of the diagnosis.

Several patients have reached the hospital with a provisional diagnosis of typhus based on the association of multiple insect bites or a sweat rash with a pyrexial illness that proved to be one of the short-term fevers or malaria. It is sometimes said that insect bites may be recognised by their distribution and that they usually itch; but incidental skin lesions are often a diagnostic red herring in the Middle East.

COURSE OF ILLNESS

The illness followed a normal course with pyrexia of 102–104° F. for 12 to 16 days. The temperature settled by rapid lysis rather than a true crisis and no secondary rise was seen. The pulse-rate was 120 to 130 throughout the pyrexial period and the temperature-pulse charts make a striking contrast with those of typhoid; the temperature readings are similar but in typhoid the pulse-rate in rarely above 90. During the second week the patients seemed to be critically ill, and mental symptoms, bronchitis, and incontinence of urine were common. Some degree of dysarthria and deafness was noted in several cases; one patient developed a palatal palsy in the 3rd week of his illness but made a good recovery.

Of the 5 patients under 30 years of age, all recovered; but 2 of the 5 older men died. The first, aged 31, died on the 24th day of illness from pneumonia. The second, aged 39, died suddenly and unexpectedly on the 9th day from cardiac failure. At autopsy petechial hæmorrhages were seen over the whole surface of the heart and there were also hæmorrhages in both suprarenals.

The 8 survivors made slow recoveries. We could not follow the progress of all of them in the late convalescent stage, but it is known that one developed effort syndrome and another an acute anxiety state precipitated by the explosion of an ammunition dump near the hospital. In neither of these did electrocardiograms show any abnormality. Both soldiers had excellent records in battles before their illness, but are unlikely to be fit for front-line service for a considerable time.

LABORATORY FINDINGS

The Weil-Felix reaction was performed in all cases by Major W. L. Rose, RAMC (see table).

Case	Day of illness	*B. proteus* OX19	*B. proteus* OX2	Case	Day of illness	*B. proteus* OX19	*B. proteus* OX2
1	9	1/480	1/960	6	5	neg.	1/60
	25	1/240	1/480		8	1/480	1/60
					15	1/960	1/60
2	7	neg.	neg.				
	12	1/60	1/960				
	17	1/120	1/960	7	8	1/1920	1/30
	32	1/60	1/480		24	1/1920	1/30
3	10	1/240	1/120				
				8	7	1/120	1/120
4	8	1/120	1/60	(died)			
	15	1/960	1/120				
	24	1/480	1/60				
	31	1/480	1/60	9	9	1/960	1/60
					15	1/960	1/480
5	6	neg.	neg.				
(died)	9	neg.	1/30	10	11	1/30	neg.
	14	1/120	1/480		19	1/480	1/30
	19	1/120	1/1920		28	1/240	1/30

Agglutination against *B. proteus* OXK was not performed since this suspension was unreliable.

The titre of agglutination was highest in 6 cases against *B. proteus* OX19 and in 3 cases against OX2. In the remaining case (no. 8) both strains were agglutinated at 1/120 on the 7th day, and the patient died two days later. In 2 cases (nos. 1 and 9) the rash was delayed and the Weil-Felix reaction was of considerable help; but in the other 8 the results were not significant until the clinical diagnosis was already fairly certain.

In 6 cases specific rickettsial agglutination tests were performed by Major C. E. van Rooyen, RAMC, at the Central Pathological Laboratory, MEF, and the diagnosis of louse-borne or epidemic typhus fever confirmed.

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TREATMENT AND PREVENTION

No specific treatment was given. Sulphapyridine was given in 2 cases when pneumonia developed. Nursing was carried out by RAMC orderlies under supervision by a sister of the QAIMNS. As soon as typhus was suspected the patient received routine disinfestation for lice, including shaving of the head and body, and was isolated in a single ward. No case of cross-infection occurred, although several patients had been in general wards before delousing was undertaken. Evidence of lice was found in only 1 case.

Personnel likely to come in contact with typhus are now protected with typhus vaccine, but this was not practicable when the first cases were being treated. Since in this Command the fatality-rate has proved to be appreciably higher in persons over the age of 30 the hospital authorities have been advised to arrange that only personnel under that age shall be in close contact with typhus cases or on duty with disinfestors.

SUMMARY

Ten sporadic cases of louse-borne typhus fever were admitted to a general hospital within three months. Diagnosis was difficult until the appearance of the typhus rash.

The Weil-Felix reaction was helpful in two cases in which the rash was delayed until the 10th day of illness.

No specific treatment was given. There were two deaths, both in men over 30 years of age.

Our thanks are due to Brigadier Sidney Smith, consultant in tropical medicine, for his helpful memoranda.

PORTAL PYÆMIA WITH RECOVERY

NICHOLAS ALDERS, MD VIENNA, M R C S
SURGEON TO THE EMS

SINCE the outlook in pylephlebitis is generally hopeless, the following case may be worthy of record.

A young man, after ligature of hæmorrhoids, developed liver abscesses bursting into the right anterior subdiaphragmatic space, which was drained successfully.

CASE-HISTORY

An Italian prisoner-of-war, aged 25, was admitted to an EMS hospital on Oct. 24, 1942, having had moderate pain in, and slight bleeding from, the anus for 6 days. There were no previous febrile attacks or dysentery or diarrhœa in his history.

On examination three prolapsed œdematous internal hæmorrhoids were found. The patient, whose temperature was normal, was put to bed, and lotio plumbi compresses were applied frequently. The pain soon ceased, the piles retracted, and a few days later were not visible on inspection. On Nov. 4, 11 days after admission, and after the usual preparation (aperients, enema, rectal lavage) he was operated on under ether anæsthesia. 'Proctocaine,' 4 c.cm., was injected into the sphincter ani, the sphincter was dilated digitally, and the three hæmorrhoids were ligatured with floss-silk. The piles were not transfixed, the ligatures being anchored in the perivenous tissue. A rubber tube was left inserted for 3 days.

The postoperative period was uneventful until the seventh day, when his temperature rose to 99·6° F.; it went up to 101° F. on the eighth day, and on the ninth day to 104·2° F. with concomitant rigor. The patient was now complaining of great weakness, headaches, and pain in his calves. A search for septic foci was made, with negative results. The perianal tissues were found to be soft and painless; there was no tonsillitis; X-ray photographs of the cranial sinuses showed them to be clear; clinical examination, subsequently confirmed by X rays, disclosed nothing abnormal in the chest, nor was there albuminuria or thrombophlebitis. The liver dullness was not increased but the patient complained of tenderness to pressure over the lower margin of the liver. Leucocyte count 12,600 (polymorphonuclears 60%, lymphocytes 37%, large mononuclears 3%). The condition was now diagnosed as "probably portal pyæmia" and 1·0 gramme sulphapyridine was administered 4-hourly for 6 days. The temperature continued to be of the swinging remittent type, the daily maxima varying from 102° to 105° F., with a second (and last) rigor on the tenth day after the operation. The general condition deteriorated rapidly and there was much wasting, but the patient complained of nothing but a vague discomfort in the upper abdomen. The search for septic foci was frequently repeated, but always with negative results; in addition the following investigations were made: Nov. 26, serum, Widal negative to *B. typhosus, B. paratyphosus A* and *B, Br. abortus*; Nov. 18 and Dec. 11, no malarial parasites seen in blood; Dec. 11, blood-count, white cells 14,000 (polymorphonuclears 68%, lymphocytes 30%, large mononuclears 2%). Ophthalmoscopy (Dr. J. Wood): media clear, fundi normal. Stools (examined twice): no cysts of *Entamœba histolytica* found. There was no jaundice.

On Nov. 27, 23 days after ligature of the hæmorrhoids, the patient complained of severe stabbing pain in the right hypochondrium, and there was tenderness and guarding in the region of the gall-bladder.

An exploratory laparotomy was performed through a right upper paramedian incision, but apart from a few adhesions round the gall-bladder nothing abnormal could be detected. The liver was of normal size, colour and consistence; no abscesses were visible, the subphrenic spaces were free, the pancreas was not enlarged. The incision healed by primary intention. The temperature continued swinging, often rising to over 105° F., but there were no further rigors. A second course of sulphapyridine was given as above, but without influencing the temperature. The patient was sinking rapidly and was delirious at times.

On Jan. 4, 1943, a large area of dullness was found extending over the right side of his chest, as high up as the 5th rib in the mid-axillary line; there was a complete absence of breath-sounds and vocal fremitus over this area.

X-ray report: "The right side of the diaphragm is considerably raised—as high as the shadow of the anterior end of the 4th rib. There is no evidence of pleural effusion. The appearances are suggestive of subphrenic abscess." A wide-bore needle was inserted into the 7th intercostal space in the anterior axillary line and thick yellow offensive pus was withdrawn. Laboratory report: "Degenerated pus-cells, no organisms seen. Cultures: no growth." Under local anæsthesia, to which nitrous oxide and oxygen had to be added during the later stages of the operation, a 2 in. length of the 8th right rib in the mid-axillary line was resected. An exploring finger entered a large cavity which was filled with thick yellow pus. It was situated between the diaphragm and the anterolateral surface of the liver, and was continuous with 2 cavities in the liver, 2 in. and 1 in. in diameter. Two rubber drainage-tubes were inserted. For three weeks there was copious discharge of pus through and alongside the tubes, and from Jan. 11 until Jan. 24 large quantities of bile were mingled with the pus. The patient's temperature did not rise above 101° F. in the week following the operation, and thereafter dropped to normal; apart from two occasions, six weeks later, when it rose to 101° F., it has since remained so. Three weeks after the rib-resection the discharge became very scanty, the drainage-tubes were expelled, and after insufflation of proflavine the discharge stopped altogether. The wound was perfectly healed by the end of February, seven weeks after the rib-resection. X-ray report of Feb. 18: "The right side of the diaphragm is still raised, but less so than before. There is some increase of density in the lung tissue above it, but no signs of lung abscess are present. There is no empyema." Report on screening, March 31: "Return of some movement of the right side of the diaphragm which is, however, still restricted."

During his long illness the patient had developed several torpid bedsores over the sacrum, the great trochanters, and the heels. These healed up slowly. He benefited greatly from the transfusion of 2 pints of blood, was up and about in mid-April, and was perfectly all right by July, 1943.

I wish to express my thanks to the Ministry of Health for permission to publish this case, to Mr. H. Dean Pollard, medical superintendent of this hospital, for his active interest in this case, to Dr. H. B. Padwick for the interpretation of numerous X-ray films, and to the nursing staff for their care and devotion.

THE Anglo-Soviet Medical Council have been asked by the Soviet Union for Stanford Cade's *Treatment of Malignant Disease by Radium*. Any reader willing to sell his copy for this friendly purpose is asked to communicate with Dr. Elizabeth Bunbury, Fountain Hospital, London, S.W.17.

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Reviews of Books

The Extra Pharmacopœia

(Martindale). Vol. II. (22nd ed.) Published by direction of the council of the Pharmaceutical Society of Great Britain. (Pharmaceutical Press. 27*s*. 6*d*.)

Mr. William Martindale, in the course of a long and joyfully arduous life, collected and filed so many items of interest that they would not all go into a volume of handy size. So he selected those he thought of most immediate value to doctors and pharmacists for vol. I of the *Extra Pharmacopœia*, leaving the rest for vol. II. The Pharmaceutical Society, as his literary executor, has more tidily and no less efficiently followed the same plan.

Vol. I (22nd ed., 1941) needs no bush; no practitioner, medical or pharmaceutical, can feel safe without it. It is different with the companion volume (1943) which has just appeared. No-one except perhaps the revision editor, Mr. C. E. Corfield, could master all of its 1217 pages, but it does (in the words of the preface) "provide the reader of the *Extra Pharmacopœia* with up-to-date information . . . in the ever-widening sphere of studies for the improvement of health, the relief of pain and the cure of disease." And besides the 372 pages of analytical addenda, the nucleus of the volume, there is a list (59 pp.) of proprietary medicines with their formulæ, an essay (42 pp.) on the nomenclature of organic compounds, information about pH and indicators and polarographic analysis, notes on methods for examination of urine, blood, CSF and stomach contents, a monograph on vitamins and another on milk and milk products, tables of infectious diseases and culture media and sterilisation, and at the very end a godsend for the non-linguist in the form of Dutch, French, German, Italian and Spanish glossaries. The index covers both volumes.

Clinical Significance of the Blood in Tuberculosis

GULLI LINDH MULLER, MD, pathologist to the New England Hospital for Women and Children, Boston. (Oxford University Press. Pp. 516. 20*s*.)

THIS book sets out to determine whether hæmatological studies should be added to routine work on the tuberculous patient. Most workers agree about the need for other forms of measurement to supplement clinical findings. Dr. Muller finds that blood studies can give information about the activity of a lesion and the degree of the patient's toxæmia *before* clinical and X-ray evidence become available; but she admits that few procedures are useful enough to be done as a routine. The book is detailed, the mathematical analysis of the data blameless, and the deductions logical: but too often they lead to no practical results. There must be few sanatoriums in this country with sufficient staff, even in normal times, to carry them all out. In the estimation of blood sedimentation rate, she agrees with Day in taking the maximum rate of sedimentation and not just measuring the amount of sedimentation in a fixed time. In counting leucocytes the information to be derived from the study of their forms by the methods suggested would scarcely be commensurate with the labour involved. But there does seem to be a place for blood studies to decide the activity or quiescence of the minimal lesions discovered by routine radiography, and Dr. Muller gives just the information wanted for this purpose.

Pasteurisation

HARRY HILL, FRSI, AMISE, FSIA, sanitary inspector for Southgate. (Lewis. Pp. 147. 10*s*.)

THIS book follows closely on G. S. Wilson's *Pasteurisation of Milk* published twelve months ago under the ægis of the Ministry of Health. It might for that reason seem redundant, but the two do not cover the same ground; the greater part of this book is devoted to the *practical* aspects of pasteurisation. Mr. Hill is forthright, even dogmatic; but he gives chapter and verse for his views. The chapters on plant design, processing methods, the care of equipment, and methods of control are admirably clear. He insists that pasteurisation can never be a substitute for clean milk, and that milk below a certain standard of cleanliness cannot be efficiently pasteurised. He also lays proper stress on sterilisation of bottles and adequate sealing, and on the washing and sterilisation of milk-cans used in bringing milk from the producer to the depot. More might have been said about the return of properly cleansed and sterilised cans to the producer, and on the care required in the handling of pasteurised milk dispatched in bulk from the pasteurising depots. It is unfortunate that milk can be dispatched from the depots in cans as well as in bottles, when the human element may cancel some of the benefits of pasteurisation.

Mr. Hill does not deal with the distribution of pasteurised milk to the countryside—a problem causing much anxiety to health officers in rural areas. Will pasteurisation safeguard rural milk-supplies as adequately as supplies in urban areas? This aspect of pasteurisation would have merited attention. The author doubts if pasteurisation is still practised from the commercial as well as from the public health side: but the present scheme to improve the keeping quality of milk is as much a commercial as a public health measure. He seems to have more respect for the Milk and Dairies Order 1926 as an instrument for the supervision of milk production than have most officials of local authorities concerned with this task. On the other hand by pungent but fair criticism, he drives home many fundamental points: thus he points out that it is illogical to insist on pure water for the community while allowing the sale of impure milk; and that distributors, large or small, unable or unwilling to supply their customers with clean safe milk are better out of business. Vendors of infected milk, he believes, should be subject to prosecution and fines as in the case of other foodstuffs. This is a book which should find a place on the shelves of all interested in the production of clean milk.

Food

Sir ROBERT MCCARRISON, CIE, MD, D SC BELF, FRCP, major-general IMS retd, late director of nutritional research, Pasteur Institute, Coonoor, South India; DESMOND FITZGERALD MOORE, MRCS, DTM & H, late senior medical officer, Colonial (West African) Medical Service. (Macmillan. Pp. 116. 2*s*. 6*d*.)

THE authors describe this book, which contains 26 little chapters or lessons and some tables of food values, as "a primer for use in schools, colleges, welfare centres &c. in Africa." There are sections on air, sunlight and water, proteins, mineral salts, fats, carbohydrates, vitamins A, B_1, "P-P," C and D. In the latter part of the book, devoted to a number of the common foodstuffs, the whys and wherefores of their various food values are discussed. In writing a primer it is, of course, essential to simplify, but this need not entail misstatements. Few people except shipwrecked mariners drink so little water that their blood becomes "thick and impure." Some proteins may be "jelly like" substances, but this is not an apt description of the hair and nails. Whole wheat, cocoanuts, molasses, dates and green leafy vegetables are not foods containing "plenty of chlorine." It is difficult for an English reviewer to assess the value of a book of this kind in an African setting. Its Indian predecessor, by Sir Robert McCarrison, already has proved its use in schools.

A Dictionary of Science

E. B. UVAROV, B SC, ARCS, DIC. (Penguin. Pp. 192. 9*d*.)

THIS little book defines and explains the terms used in chemistry, physics and elementary mathematics. One or two useful relevant facts as a rule follow the definition. Although chemistry stretches into biochemistry, the value of this book to medical workers will be in enabling them to look up forgotten or unfamiliar terms in the exact sciences. It should be on every newspaper subeditor's desk.

Narco-Analysis

J. STEPHEN HORSLEY, MRCS, deputy medical superintendent of the Dorset Mental Hospital. (Oxford University Press. Pp. 134. 8*s*. 6*d*.)

IN this manual the author's own experience is set off by long quotations from everybody who has written about the subject in the journals, even if only in the correspondence columns. Repetition and unpruned case-records further mar what might have been a useful, concise review of how barbiturates can now be utilised in psychiatry.

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THE LANCET

LONDON: SATURDAY, JANUARY 29, 1944

HEALTH IN AND OUT OF SCHOOL

THE new Education Bill contains proposals for the care of the child's body which will require a school medical service of the highest quality. The largest change is found in the clause which imposes on local education authorities the duty of providing for the medical inspection *and treatment* (other than domiciliary treatment) of all the children and young persons attending maintained schools and young people's colleges, such treatment to be provided free of cost. This covers the age-period of 5 to 18, and it also covers most of the population of this age, for the benefits of the medical services can be extended to pupils of direct-grant and independent (i.e., "public" and private) schools by agreement between the local education authorities and the proprietors or responsible governing bodies. The medical service deals with the normal child, but there are equally large extensions for the handicapped child. In the first place the duty of ascertainment, hitherto confined to defective and epileptic children, is extended to all types of children whose needs are not met in ordinary school routine, and it is also extended to the pre-school child, between 2 and 5 years old, since local education authorities must ascertain what children in that age-group need special educational treatment. Particular mention is made, in the explanatory memorandum,[1] of the maladjusted child. Certification of the mentally or physically defective child is abolished and the local education authority is instead to be obliged to provide special educational treatment for the less seriously handicapped within the ordinary schools and for the more severely handicapped in special schools. The age for attendance at such special schools is lowered from 7 to 5, and parents of any child over the age of 2 may ask for an examination with a view to such special education as may be necessary. Attendance at special schools will be legally allowed beyond the present age of 16.

For the care of the normal and abnormal child, thus covered more comprehensively than ever before, the school medical service will need considerable expansion. But its duties should not end with inspection and treatment. Extended provision for the supply of milk and school meals on the one hand, and for physical training and recreation on the other, should mean that the school authorities will take advice from the school doctor—advice which should be constantly forthcoming, based on our increasing knowledge of nutrition and physical well-being. Moreover on sex education, on matters of school hygiene, even hours of work, the school doctor should be playing a most important part. Where schools are established for children under 5, the emphasis must surely lie less on formal learning, which is wholly unimportant at this age, than on health and adaptation to a gregarious life. In such schools regular and detailed medical supervision, partly through the daily visits of a trained nurse, will be an obvious necessity.

1. Board of Education. Cmd. 6492. HMSO. 3*d*.

The Board of Education was driven in 1907 to supervise the health of the school population because no-one else was doing it. The service devised for the purpose was incomplete, but an opportunity is now given to the profession to take part in a larger and more valuable undertaking. The Minister says in effect: education is my job, but I am not prepared to have it thrown away on the ailing; he demands for the children "proper medical inspection" and "comprehensive facilities for free medical treatment," just as he demands for them "milk meals and other refreshment." In meeting these needs there is room for new ideas and new experiments, especially perhaps in the reintegration of school medicine with other relevant medical work. It has been a weakness of the existing school service that its members too often restrict themselves to a limited routine. The child, moreover, is part of the community, and the medical service for children in school should not be isolated from any comprehensive medical service devised for that community. It must not be regarded as a subsidiary function of the education department, but rather as an organic part of the health services. Mr. BUTLER was emphatic about this (see p. 166) when he moved the second reading of the bill last week.

If the hours of the day are counted it will be found that of his first 16 years the child spends no more than 2½ of them in the schoolroom; and had health centres been available when the present service was planned, no-one might ever have thought of segregating children in special clinics away from the families whose disposition, habits, infections and resistance they share. On the other hand we must admit that the special clinic has its advantages, and it would not be sensible to start our new Golden Age by abolishing the facilities now available in school clinics for the treatment of impetigo, running ears, blepharitis, excessive adenoid tissue, defective vision, and certain orthopædic conditions. These disorders chiefly affect children, and from the practical standpoint there is something to be said for treating them in special premises within the ambit of the educational department. Convenience would again decree that each school should ordinarily have only one medical officer. Before the war there were something over 1½ million routine medical inspections a year, and more than 2 million special examinations (not to mention 3 or 4 million routine dental examinations); and no doubt there ought to be many more in future. The dislocation these inspections cause in educational activities is at present minimised by entrusting them mostly to assistant medical officers of health, who can fit their duties into the school programme. Any system by which each general practitioner tried to follow his own young patients into school would create chaos, and it might be almost as awkward to arrange for every child to be inspected at a health centre by his own family doctor. If, when, or where school medical inspections are conducted at, or from, health centres, it looks as though they ought to be deputed to one or more practitioners on the staff of the centre who are regularly available and can give the task the close attention it deserves. While it is true that school medicine should not generally be practised by doctors who do nothing else, it is equally evident that it is best practised by doctors with special knowledge, experience, and interest.

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We hope that in the new and enlarged school medical service much of the routine work will be done, part-time, by general practitioners; but those who undertake it must be ready to cultivate, by additional training if necessary, a physiological outlook. Nobody should think such work unworthy of his skill; for the stone that so many builders have rejected is now being raised into its proper place as the head of the corner.

ALLOXAN DIABETES

IT may be very hard for an experimenter to decide what he should do when an unexpected but potentially important side-result appears during his investigations. If he follows it, he may make a significant discovery unrelated to his original problem, or he may get lost in a maze leading nowhere. It needs both luck and intuition to know which course to take; the histories of penicillin and the treatment of Graves's disease with thiourea are examples of the results of both courses. The recent work of Professor SHAW DUNN and his colleagues at Glasgow provides another illustration.

In 1937 JACOBS [1] reported that alloxan injected into rabbits could produce hypoglycæmia, which could immediately be relieved by intravenous glucose; he suggested that this was not a physiological effect and gave no details of morphological changes. SHAW DUNN had made a special study of kidney diseases both in men and animals, and in the latter part of 1942 was conducting some experiments to elucidate the morphogenesis of "crush syndrome" and the anuria following incompatible blood-transfusion. In the crush syndrome there is necrosis of the second convoluted renal tubule and SHAW DUNN was looking for substances that might induce this change. In his previous work he had found that uric acid on occasion produced changes in tubules, and accordingly he tried uric acid and kindred substances such as alloxan. He found that alloxan did cause the renal changes he had hoped for, but unfortunately most of the animals died in the first day or so with symptoms which did not seem referable to the renal changes. Twenty-four hours after an intravenous injection of 200–300 mg. of alloxan per kg. body-weight, the rabbits were comatose with slow and feeble respiration and hypothermia; the blood-urea was only slightly raised but there was severe hypoglycæmia. Since the animals were moribund they were killed, and post mortem no gross changes were found in any of the organs except the kidney. Microscopic examination of the tissues, however, revealed a selective but complete necrosis of the islets of Langerhans in the pancreas. At that time the investigators were unaware of JACOBS's production of fatal hypoglycæmia with alloxan; but they rightly decided to abandon for the time being their original inquiries and follow the side trail. More careful study of the blood-sugar showed that an hour or so after the injection of alloxan there was a considerable hyperglycæmia followed by a fall, and the symptoms and lesions apart from the necrosis of the islet tissue were essentially those of hypoglycæmic coma.[2] [3] In rats identical changes were observed, but the necrosis of the individual islets was not so complete and in some cases it could be seen that the β cells were chiefly affected; furthermore a proportion of the rats survived the hypoglycæmic phases and then developed glycosuria and hyperglycæmia controllable by insulin.[4] A simple method had thus been found for inducing and maintaining in animals a condition closely resembling diabetes mellitus in man.

The Glasgow discovery has since been confirmed by BAILEY and BAILEY,[5] working in the Boston clinic of that great authority on diabetes, ELLIOTT P. JOSLIN, while in our present issue HUGHES, WARE and YOUNG, of St. Thomas's Hospital medical school, also report its confirmation. Both these groups of workers appear reluctant, however, to accept the hypothesis put forward by SHAW DUNN to explain, among other facts, the remarkable fall of blood-sugar which alloxan induces in rabbits before the diabetic condition develops. According to this hypothesis alloxan has a stimulating action on the islet cells, which may be of physiological significance but which may, under some conditions, lead to the death of the islet cells from overwork. HUGHES, WARE and YOUNG show that the amount of insulin known to be present in the pancreas of the normal rabbit is sufficient, when administered as a protamine-zinc preparation, to reproduce the hypoglycæmic action of 200 mg./kg. of alloxan in this animal. As they admit, such evidence is not unequivocal, but it certainly suggests that there is no necessity to assume that alloxan lowers the blood-sugar by any means other than killing islet cells which are thus made to liberate their content of preformed and stored insulin. Should this explanation prove correct it will not of course make SHAW DUNN'S work any less important or suggestive.

However unexpected a discovery may be, earlier relevant observations can usually be found. The search for them is most easily initiated by consulting the remarkably comprehensive *Index Catalogue* of the library of the Surgeon-General, US Army, which is available in most medical libraries; it is not as difficult as it may seem to the uninitiated, and may reveal facts of absorbing interest. Professor YOUNG and his colleagues have drawn attention to statements by LIEBIG, LANG and others, many years ago, that alloxan may be found in animal secretions, and these support the possibility, suggested by SHAW DUNN, that this substance may sometimes be implicated in the genesis of diabetes mellitus. Undoubtedly an abnormality of purine metabolism, giving rise to alloxan, might conceivably cause damage to the pancreatic islets over a long period. It may be worth recalling, too, that Baron JUSTUS VON LIEBIG published in 1862 a long account of THOMAS GRAHAM'S experiments on the diffusion of substances through semipermeable membranes, and then proceeded to apply the analytical tool thus provided to a specimen of mucus which, as he relates, by good fortune he had collected from a case of "intestinal catarrh."[6] By a number of tests he was able to satisfy himself as to the presence, in the dialysate of an aqueous extract of the mucus, of the substance alloxan which he and WÖHLER [7] had previously identified as a product of the chemical oxidation of uric acid. More and more attention is now being paid to mucoproteins; they

1. Jacobs, H. R. *Proc. Soc. exp. Biol. NY*, 1937, **37**, 407.
2. Dunn, J. S., Sheehan, H. L. and McLetchie, N. G. B. *Lancet*, 1943, **i**, 484.
3. Dunn, J. S., Kirkpatrick, J., McLetchie, N. G. B. and Telfer, S. V. *J. Path. Bact.* 1943, **53**, 245.
4. Dunn, J. S. and McLetchie, N. G. B. *Lancet*, 1943, ii, 384.
5. Bailey, C. C., Bailey, O. T. *J. Amer. med. Ass.* 1943, **122**, 1165.
6. Liebig, J. von *Liebigs Ann.* 1862, **121**, 80.
7. Wöhler, F. *Ann. Pharm., Heidelberg*, 1838, **26**, 241.

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interest those concerned with substances of bacterial or glandular origin which promote diffusion through animal tissues,[8] and have recently been related to diseases of the joints,[9] the early diagnosis of wound infection,[10] fertilisation of the mammalian ovum,[11] and blood-group A factor.[12] If alloxan is a constituent of mucoproteins its physiological significance may be much greater than was ever thought.

THE VETERINARY OUTLOOK

THE coming of a second world war, with a consequent shortage of food, has again made the people of these highly industrial islands realise that their existence ultimately depends on the soil and the livestock it carries. Arable farming and livestock production are interdependent, but the importance of the latter in Great Britain is shown by the fact that it accounted for 70% of the gross agricultural income of £265 million before the war. The health of livestock is a correspondingly vital interest.

Foot-and-mouth disease, though still troublesome, is much better controlled in this country than on the Continent, and the days are long since past when epidemic diseases such as rinderpest and contagious bovine pleuropneumonia decimated our cattle population. The eradication of these acute infections is largely attributable to the slaughter policy long advocated by veterinary authorities and at last adopted in the latter part of the last century; though part of the gain in health is no doubt a result of cattle being no longer kept in town cowsheds of the type described by BYNG in 1847:

> "Forty cows are kept in them, two in each seven feet of space. There is no ventilation, save by the unceiled tile roof, through which the ammoniacal vapours escape. . . . Besides the animals, there is at one end a large tank for grains, a storeplace for turnips and hay, and between them a receptacle into which the liquid manure drains, and the solid is heaped . . . the stench thence arising (is) insufferable."

Today, however, the epidemic diseases have been replaced in importance by less spectacular chronic infections that are harder to control. The National Veterinary Medical Association has estimated that mastitis, contagious abortion, and sterility deprive the country of roughly 200 million gallons of milk per annum, while the death of calves and cost of replacing cows mean a loss of over £5 million. In addition there are the losses from tuberculosis and Johne's disease. In a presidential address to the NVMA last September Mr. W. R. WOOLDRIDGE, PH D, put the total cost of insidious diseases of cattle at not less than £30 million.[13] While most emphasis is rightly placed on diseases of the dairy cow, the wastage from disease and bad management among pigs, sheep and poultry is also considerable.

Eighteen months ago, in an attempt to reduce disease in dairy cattle, a scheme was launched jointly by the NVMA and the National Farmers Union with the support of the Ministry of Agriculture. Under this scheme the veterinary practitioner agrees to advise on the control of specified diseases, and treat them, for an annual fee of 10*s*. per cow. A total of 6568 contracts covering 269,839 cows and heifers have been notified. That many practitioners are finding the work of great interest there can be no doubt, but many also look upon it as a contribution to the war effort which cannot be continued afterwards on the present financial basis. The increasing appreciation by the farmer of the veterinary surgeon's purpose and difficulties does something to lighten the heavy labour involved and a sense of joint responsibility for the health of the herd has been developed. Unfortunately, however, the means for controlling the diseases in question are by no means perfect. Though the live vaccine against contagious abortion[14] seems to be giving good results, the methods for controlling or treating the various forms of mastitis are sometimes laborious and not always effective. A potent and readily available chemotherapeutic agent would be of great value, but further research is needed before this intractable disease is fully understood and controlled. The same is true of sterility, which a number of whole-time veterinary officers are studying under field conditions. Tuberculosis is not included in the scheme, but the Ministry of Agriculture's veterinary laboratory is now producing an improved tuberculin for testing cattle, and intensive work is being done there and elsewhere on the various problems of tuberculin-testing. At present there are 16,146 herds attested as free from tuberculosis, which represents real progress. Yet among the few things that farmers from the USA criticised when visiting this country were the relatively small extent to which such diseases as contagious abortion and tuberculosis have been eliminated from dairy herds, and the cross-breeding and poor quality of many commercial animals. The white-paper outlining Measures to Improve the Quality of the Nation's Milk Supply,[15] while proposing compulsory pasteurisation on a limited scale which will no doubt be extended, attaches great importance to the upgrading of the nation's dairy herd and the control of disease. Arrangements are being made, as fast as the shortage of veterinary personnel will allow, to increase the number of inspections of herds, and it is also intended that veterinary officers shall become responsible for the conditions under which milk is produced. It is felt that these inspections, combined with the scheme for the control of diseases of dairy cattle and the Milk Testing and Advisory Scheme, will do much to raise standards.

These projects may bear little fruit, however, unless future veterinary surgeons are trained for their wide duties. In India and South Africa the central veterinary institutes at Muktesar and Onderstepoort are responsible for work not only on disease control but also on animal husbandry and animal nutrition. The resultant comprehensive outlook has led to big advances; but, although the research and teaching institutions throughout the Empire have been staffed mainly by men from the home veterinary colleges, the latter still have no adequate facilities for the larger sphere of work. In its first report the Loveday Committee on Veterinary Education showed itself well aware of the significance of these subjects, and now that it has been recalled it will no doubt explain the need further; for in veterinary as in human medicine the value of good environment and sound nutrition is increasingly apparent. Facili-

8. McClean, D. *Lancet*, 1941, i, 797.
9. Robertson, W. V. B., Ropes, M. W. and Bauer, W. *J. biol. Chem.* 1940, **133**, 261.
10. McClean, D., Rogers, H. J., Williams, B. W. *Lancet*, 1943, i, 355.
11. McClean, D. and Rowlands, I. W. *Nature, Lond.* 1942, **150**, 627.
12. Meyer, K., Smyth, E. M. and Palmer, J. W. *J. biol. Chem.* 1937, **119**, 72.
13. *Vet. Rec.* 1943, **55**, 395.
14. *Ibid*, 1942, **54**, 175.
15. See *Lancet*, 1943, ii, 78.

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ties at the veterinary colleges for research in animal physiology, nutrition, and animal husbandry, as well as pathology, would serve the double purpose of adding to our knowledge and providing teaching material and inspiration for students: the specialised research institution does not enlighten students in this way. It is therefore particularly pleasing that the main objects of the Veterinary Education Trust, the formation of which was announced last year by WOOLDRIDGE,[16] are to provide increased facilities for teaching and research at the colleges, so that teachers will be better able to carry on their own original investigations. The trustees hope to raise at least £1,000,000, which should enable them also to offer scholarships for postgraduate study.

The maintenance of healthy livestock and the inspection of livestock products by men well trained in animal husbandry and animal pathology are essential contributions to human health. How the veterinary profession will be organised to fulfil these tasks is uncertain; but it is interesting to find WOOLDRIDGE speaking of the possible formation of an Animal Health Corporation, reminiscent of proposals for the future organisation of medicine. Whatever the final solution, it is certain, as he said, that the time is opportune for devising and adopting a settled policy to improve animal health and human nutrition and to give the veterinary profession its rightful place in national welfare and council.

Annotations

CONGENITAL MALARIA

FOR many years the weight of evidence seemed to be against transmission of malaria through the placenta; but well-authenticated examples of such transmission have steadily grown in number. Among the more striking cases reported is that of Jones and Brown[17] in which a woman returning from a holiday on the continent had several bouts of malaria during her pregnancy and was delivered in Buckinghamshire (where there is no indigenous malaria and anopheles are not usually found) of a child who developed malaria 16 days after birth, the organism being *Plasmodium vivax*. Hale, Tanner and Hewlett[18] reported congenital malaria in one of a pair of twins, born in London in January—which made transmission by mosquito exceedingly unlikely. *P. vivax* was again the invader. Buckingham[19] has demonstrated *P. falciparum* in the blood of a fœtus before birth. Blacklock and Gordon[20] in Sierra Leone found that in 38% of pregnant women infected with *P. falciparum* the maternal villi of the placenta became intensively infected, and the fœtus died though no parasites were found on the fœtal side of the syncytiotrophoblast layer. Jean and Van Nitsen[21] found malarial schizonts in the spleen of 8 children of malarial mothers, born dead, or dying shortly after birth. Wickramasuriya[22] describes 6 cases in which malarial parasites were found in the placenta and also in the blood of tissues of the infant, either before or just after birth; he considers that transmission of the infection may often cause death of the fœtus: only one of the 6 infants survived. Lately Cohen,[23] working in a malarial district of Latin America, has published 6 more cases in which the mother was infected and parasites were present in the peripheral blood of the child at birth. He has also noted 3 cases of "latent malaria" in babies born of women with chronic malaria. No parasites were found in the blood of these infants, but they failed to thrive and lost weight until given 'Euquinine,' after which they grew up normally. As a result of this study, Cohen gives euquinine to malarial women during pregnancy in doses not exceeding 0·9 gramme daily, and finds there is no added tendency to abortion—indeed, the drug may prevent it.

The mechanism of transmission is still not clear. Wickramasuriya was struck by the unusually dark and friable placentas of some of his malarial cases and this led him to investigate the possibility of transplacental fœtal infection. He found that parasites become aggregated in the placenta, and it is possible in some cases to find positive placental smears where blood examination has been repeatedly negative. It is usually assumed that an intact and physiologically healthy placenta will not permit the passage of parasites, and some mechanical breach is therefore usually postulated. Lopatin[24] suggests that the child may be infected at parturition during detachment of the placenta, when maternal and fœtal blood may mingle. This would not account, however, for cases of intrauterine infection; and it may be supposed that the pathological changes induced in the placenta by malaria are sufficient to make it permeable by the parasites. This seems to be borne out by Wickramasuriya's finding that transplacental infection is most commonly by the malignant tertian parasite—the most destructive of the plasmodia.

TRENDS IN PHARMACY

AT the present time pharmaceutical students receive a preliminary training of university standard in general science and then proceed to make a detailed study of the methods of dispensing and of the nature of the raw materials employed in medicaments. After qualification the majority enter retail practice and on account of commercial competition spend much of their time in selling goods, an occupation for which little scientific knowledge is necessary. In the future even less time will be required for dispensing and the rôle of the pharmacist will be that of an intelligent distributor of ready-made and centrally standardised products. This view was put forward by Sir Henry Dale when (as reported last week, p. 137) he addressed the Pharmaceutical Society after receiving the Hanbury memorial medal. His forecast was reached after a review of the changes in materia medica and advances in pharmacology made during the present century. Most of the medicaments described in the *BP* 1914, with the exception of the organic chemicals, could be prepared within the walls of the average pharmacy, but in the next Pharmacopœia, published 18 years later, the range of preparations was extended beyond any possible pretence that they could be extemporised; and the addenda to the *BP* 1932 include many which are the subject of patent processes. These changes have been largely a result of discoveries in the fields of chemotherapy, vitamins, hormones, and immunological products, none of which can be manufactured or standardised by the retail pharmacist. They require a skilled team of workers and only production on a large scale is economically possible. Sooner or later, then, the pharmacist's sphere of action will be translated from the dispensary to the laboratory, and possibly to the hospital. Dale foresaw similar important changes in the organisation of medicine if the fruits of new knowledge were to be made available for the benefit of the ordinary citizen in his own home. Domestic practice, if it is to remain more than a sorting machine, must have the common laboratory facilities which any modern hospital affords. The position of pharmacy is one for careful consideration

16. *Ibid*, 1943, **54**, 403.
17. Jones, J. L. and Brown, H. C. *Lancet*, 1924, ii, 1058.
18. Tanner, N. C. and Hewlett, R. F. L. *Ibid*, 1935, ii, 369.
19. Buckingham, E. W. *China med. (Miss.) J.* 1925, **39**, 1140.
20. Blacklock, A. B. and Gordon, R. H. *Ann. trop. Med. Parasit.* 1925, **9**, 327.
21. Jean, L. and Van Nitsen, R. *Bull. méd. Katanga*, 1927, **4**, 131.
22. Wickramasuriya, G. A. W. Malaria and Ankylostomiasis in the Pregnant Woman, London, 1937, p. 61.
23. Cohen, R. R. *Obstet. Ginec. lat.-amer.* 1943, **1**, 431.
24. Lopatin, G. M. *Trans. Kuibyshev milit. med. Acad. Red Army*, 1940, **4**, 215.

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by those who plan the educational scheme for future pharmacists. The impending dichotomy into educated distributors on one side and scientific workers on the other raises the question whether pharmacy should be limited to one type of qualification. For the distributor a short scientific training plus a knowledge of business methods should be sufficient; the scientific pharmacist would require a three or four years course in basic science plus additional study in one special subject such as pharmacology, bacteriology, or biochemistry. Alternatively the training in biochemical analysis which pharmacists now take voluntarily after qualification might be incorporated into the regular training for the chemist and druggist examination. Biochemistry now rivals bacteriology in its importance for diagnosis and the control of treatment; with its technical procedures the pharmacist is already familiar from his work in drugs, so that no great difficulty should arise in extending the horizon to biological vehicles. The pharmacist would then be able to collaborate more fully with the domestic physician, and to offer him facilities in areas where laboratory facilities are not available. Though Sir Henry Dale's prophesy may have an astringent smack to those accustomed to the old regime of potions, pills, suppositories and powders, it will stimulate all who have the welfare of pharmacy at heart.

CASTRATION FOR CANCER OF THE PROSTATE

THE treatment of prostatic cancer by castration is a rational one, for the prostate depends mainly on the testicles for its biological activity and existence, as John Hunter observed long ago. It has been shown [1] that tumours of the prostate, even though malignant, may like the normal prostate elaborate acid phosphatase in response to testosterone propionate, which proves that these new growths are not always independent of gonadal influence. Moreover it is common knowledge that bilateral castration leads to atrophy of the normal prostate and to shrinkage of benign enlargements of that organ. On these grounds it was reasonable to hope that castration, by causing atrophy of secreting cells and general deturgescence of the gland, might relieve local tension in cases of prostatic cancer, and so mitigate pain; it was conceivable too that the growth of the tumour itself might be retarded and that subsequent operative removal might be facilitated. Since this form of therapy was advocated on scientific grounds by Huggins and Hodges in 1941 enough experience has accumulated [2] to establish the value of castration as a temporary palliative in some cases of prostatic cancer. In a matter of this kind, however, premature condemnation or commendation may be fatal to progress. Some fifty years ago, when there was no satisfactory alternative available, the beneficial results of castration on benign prostatic enlargement were disregarded and soon forgotten, merely because of an erroneous rumour that castration caused insanity. Here we see a lamentable outcome of premature condemnation. An example of the ill effects of precocious commendation may be found in the history of oöphorectomy for mammary cancer. Because the mammæ are governed by the ovaries, Beatson,[3] towards the end of last century, suggested that removal of the ovaries might be of some benefit in cancer of the breast. His suggestion was adopted and enthusiastic reports soon appeared; the procedure seemed likely to be generally adopted, at least as a palliative. Nevertheless it was not long before it was abandoned even by its most optimistic advocators. Now the value of castration in prostatic cancer is being questioned in the light of experience. Kretschmer [4] has tried it in eleven cases, and though some temporary alleviation of distress seems to have followed the operation in most instances there was no evidence of a permanent cure. We must have patience. Five or more years must be allowed to go by before a serious attempt can be made to assess the curative, as distinct from the palliative, value of this as of any other treatment for prostatic cancer.

1. Gutman, E. B., Sproul, E. E. and Gutman, A. B. *Amer. J. Cancer*, 1936, **28**, 485. Gomori, G. *Arch. Path.* 1941, **32**, 189. Huggins, C. and Hodges, C. V. *Cancer Res.* 1941, **1**, 293.
2. Huggins, C. *Science*, 1943, **97**, 541. Lane, T. J. D. *Lancet*, 1943, **i**, 166. 3. Beatson, G. T. *Lancet*, 1896, **ii**, 162.
4. Kretschmer, H. L. *J. Amer. med. Ass.* 1943, **123**, 755.

ROUNDABOUT ROUTES

"BRITISH medicine," writes Dr. Hugh Clegg, "is rather like a network of English country roads, twisting and turning this way and that, coming at times upon unexpected vistas, apparently developed on no clear plan, but nevertheless leading somewhere." In his *Medicine in Britain* [1] he proves himself a reliable guide either for the total stranger or the bemused native. His account, written for the British Council, is short and contains much useful information; but he is never in a hurry, and often indeed stops to admire the enterprise of our forefathers without whom we should have no roads at all. Like most Englishmen, Clegg rather prefers them bent; it does not bother him unduly to find 24 different licensing authorities offering registrable qualifications by the wayside, and he likes the individualism of English institutions, which, whatever their faults, "have given colour and vigour to medical life in the British Isles." His task in this attractive little book is to describe rather than to criticise, and in easy style he conveys well-chosen facts. But although, like many others, he enjoys curious ways of getting to destinations, he is not prepared to let this enjoyment prevent progress where it is really needed. "The medical profession of Great Britain," he says in conclusion, "will not lag behind the general public in insisting that what must come first is the health and well-being of every man, woman, and child in the country, and in pressing upon the Government that these must be secured whatever the cost."

RHEUMATIC THROMBOPHLEBITIS

ACUTE rheumatism is not commonly regarded as a cause of thrombophlebitis, but evidence is accumulating that involvement of the veins must be considered yet another of the protean manifestations of this scourge of childhood. One of the difficulties here is that venous thrombosis may occur in congestive heart-failure irrespective of its ætiology; thus, if a vein thromboses in a patient with a failing rheumatic heart it may well be impossible to say whether the clot is due to phlebitis or to the failing circulation. The tendency has been to exclude a rheumatic phlebitis as the cause of the thrombosis unless it appeared at the same time or shortly after active rheumatic manifestations elsewhere, such as joint pains or subcutaneous nodules. Poynton,[2] than whom no-one had a greater knowledge of acute rheumatism in children, was one of the first to record extensive venous thrombosis in children with rheumatic fever, and, since in all his cases the thrombosis was accompanied by manifestations of the disease elsewhere, he concluded that the thrombosis was due to an active rheumatic infection of the veins. Obviously the most satisfactory evidence of the thrombosis being due to a rheumatic phlebitis would be the detection of the characteristic Aschoff nodules in the walls of the damaged vein. It is here that the evidence is still inconclusive, though Perry [3] reported a case of acute rheumatism complicated by thrombosis of the right innominate vein, in which he was able to demonstrate Aschoff nodules in the media of the vein. Russek and Abbott [4] now record a case in which thrombosis of the internal jugular vein in a patient

1. Medicine in Britain. By Hugh Clegg (deputy editor of the *British Medical Journal*). British Life and Thought No. 17. 1943. Longmans, Green & Co. Ltd. Pp. 46. 1s.
2. Poynton, F. J. *Lancet*, 1898, **ii**, 206.
3. Perry, C. B. *Ibid*, 1933, **ii**, 966.
4. Russek, H. I. and Abbott, G. A. *Amer. Heart J.* 1943, **26**, 542.

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who died of rheumatic heart disease was found to be due to rheumatic phlebitis; sections of the walls of the affected vein showed fibrosed Aschoff nodules. The thrombosis took place long after there had been any clinical evidence of active rheumatic infection elsewhere, and at necropsy no evidence of an active rheumatic infection was found except in the vein. Thus there seems little doubt that acute rheumatism may be responsible for thrombophlebitis and that it may be the sole manifestation, but care will sometimes be needed to exclude congestive heart-failure as the cause.

COMMON GROUND

WE are apt to think of medicine as an example of enlightened international effort; and so indeed it is. But Dr. Melville Mackenzie's Harben lectures this week to the Royal Institute of Public Health pointed out room for improvement. "Today," he said, "we still see on every hand the results of nationalism in medicine"; for example the information given on death certificates varies so much that national death-rates for diseases are not comparable; therapeutic agents are standardised differently; pharmacopœias are not unified; and even temperatures and weights and measures are expressed variously. The Office International d'Hygiène Publique did good work in its forty years' existence, and the Health Organisation of the League of Nations has explored the possibilities of international collaboration. But the League has been hindered by its lack of universality, and now there is "no international health organisation world-wide in character, covering all aspects of medicine, and politically acceptable to at least two of the most powerful countries." Standing in much the same position as public health work half a century ago, international medicine has to face the criticism of conservative opponents. But Dr. Mackenzie, newly returned from the UNRRA conference at Atlantic City, sees very clearly—as all who study the subject must see—the opportunity before it immediately after this war. On urgent relief he has already written,[1] and he has helped to make hopeful plans.[2] For medicine, as for the public, there is a lesson in the words of UNRRA's director-general Mr. Henry Lehman: "When our victorious United Nations' armies complete the liberation of the suffering peoples, it will no longer be a question of how much we contribute out of our largesse to aid the starving and the sick, but rather how completely we are willing to share our limited joint resources to aid the sick and the starving." Looking further ahead, Dr. Mackenzie made suggestions about the possible structure of permanent health organisations. Whatever our other opinions we shall all agree with him that for success "political action must be a tool in the hands of medicine, and not the reverse, as has too often been the case."

HEART SIZE IN CARDIAC INFARCTION

A CLINICAL estimate of heart size is difficult to make in acute cardiac infarction, because the apex-beat is often impalpable. Moreover, since the apex-beat even when it can be felt will indicate only the position of the left lower contour of the heart, and tell nothing of the other contours, the X-ray method is the only satisfactory one. This is difficult to apply to patients as seriously ill as those with acute cardiac infarction, but the attempt has been made by Massie and Miller[3] who took teleradiograms of 16 patients within 24 hours of the onset of the attack while they were supported in a sitting posture. Further radiograms were taken at intervals over a period of some months. Using the cardiothoracic ratio as a measure of heart size, half the cases showed a significant change in heart size in successive films, some an increase, others a decrease. Of 4 cases showing a change in the first fortnight of the illness, the heart became smaller in 2, and larger in 2. In 12 the lung fields were cloudy, but only 7 of these showed changes in heart size, and the direction of the change is not specified. From this small series it is not possible to say how heart size and shape are affected by an acute infarction. The condition is complex in that the shock factor is likely to reduce heart size while congestive failure may have the opposite effect. Symptoms of the latter are more common in patients with a history of previous infarction, and most of this series had such a history, but we are not told whether these were the patients who showed pulmonary congestion. A change of 1 cm. or more in the transverse cardiac diameter was regarded as significant, but before this can be accepted any alteration in the height of the diaphragm must be ruled out, and the exposure of the X-ray film must be long enough to record the diastolic size of the heart, two precautions which may not have been taken.

1. Mackenzie, M. *Lancet*, 1943, i, 183.
2. *Lancet*, 1943, ii, 735.
3. Massie, E. and Miller, W. C. *Amer. J. med. Sci.* 1943, **206**, 353.

THE NEW INDUSTRIAL QUARTERLY

INDUSTRIAL medicine was growing rapidly before the war, and the war has given it a mighty boost. Some indication of the rise in numbers of whole-time industrial medical officers is given by the membership of their association, which, started in 1935, had 54 members in 1937 and now has over 300. Last year, too, saw the establishment by the MRC of a department of industrial medicine at the London Hospital. But in his foreword to the first number of the *British Journal of Industrial Medicine*,[1] for January, 1944, Lord Moran reminds us that the firms which bear the main burden of industry are mostly too small to have a whole-time works doctor, and will turn for advice to the general practitioner. He looks forward to the time when the whole-time medical officers of big firms will be specialists in this field, acting as consultants for the part-timers. The new journal, edited by Dr. Donald Hunter, closely resembles the *Archives of Disease in Childhood* in format (with a touch of lead in its cover), and is also published under the auspices of the British Medical Association. It is intended for both whole- and part-timer—for the mass of doctors who cannot do their best for their patients unless they study the conditions in which people work, in factory, mine, shipyard, bus, office or shop. Many of these doctors are cut off from lectures and libraries—more especially in war-time—and have little time for selecting their reading from a multitude of journals. If the new quarterly helps them to bring and keep their knowledge of industrial problems up to date the trouble of launching it in war-time will be well repaid.

Dr. W. W. C. TOPLEY, FRS, secretary to the Agricultural Research Council and formerly professor of bacteriology and immunology at the London School of Hygiene, died in London on Jan. 21 at the age of 58.

We also regret to announce the death at Lossiemouth in his 79th year of Dr. J. S. FAIRBAIRN, consulting obstetrical physician to St. Thomas's Hospital and sometime president of the Royal College of Obstetricians and Gynæcologists.

Prof. B. A. MCSWINEY will deliver the Oliver-Sharpey lectures to the Royal College of Physicians of London on Thursdays, March 2 and 9 at 4 PM. He is to speak on afferent fibres of the abdominal viscera.

On Friday, Feb. 18, at 4.30 PM, Dr. FRANCIS PRESTON will speak to the Clinical Society of the Royal Eye Hospital, Southwark, S.E.1, on ophthalmic prescribing and therapeutics.

1. Subscription 25*s*. Payable to BMA House, Tavistock Square, London, W.C.1.

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Special Articles

MEDICAL RESEARCH IN THE UNITED STATES AND CANADA

(FROM A CORRESPONDENT)

IN the United States in peace-time there is no body corresponding to our Medical Research Council. That is to say, there is no organisation provided with government funds which can initiate research on war problems when war breaks out. There is a National Research Council having its headquarters in Washington, which has a division of medical sciences; but American law does not permit the National Research Council to act as an executive department under the President. Medical research is nevertheless organised by the President through the Office of Emergency Management which enables him to set up a large number of administrative offices of all kinds for the war.

One administrative office of this kind is the Office of Scientific Research and Development. This has two divisions, one concerned with chemical and physical sciences, and the other the Committee on Medical Research. This committee is provided with substantial funds to initiate and support research work on urgent problems. It has its headquarters in the National Research Council building and has the advice of the subcommittees of the Division of Medical Sciences of the National Research Council to assist it in its decisions. The chairman of the Committee on Medical Research is Dr. A. N. Richards, who formerly held the chair of pharmacology in the University of Pennsylvania. In the middle of 1942 the Committee on Medical Research was still only a few months old and its position seemed to some extent uncertain. Its increasing strength and authority is very largely due to the wisdom with which Dr. Richards has managed its affairs; he commands respect everywhere.

Liaison between the Medical Research Council in London and the Committee on Medical Research in Washington has been maintained closely since America's entry into the war. Sir Henry Dale and Prof. E. D. Adrian went first to the United States to initiate the liaison at the end of December, 1941. They returned after 2–3 months, and then liaison officers were exchanged for longer periods; an American representative came to stay in London in March, 1942, and a British representative went to Washington in May, 1942. The first American representative was Dr. Kenneth B. Turner of the Presbyterian Hospital, New York; he was succeeded in May, 1943, by Dr. Joseph Ferrebee of Harvard. As British representative, Prof. J. H. Burn, of Oxford, covered the period to October of last year and Prof. A. D. Macdonald, of Manchester, has now followed him. Each has been responsible for keeping his own people informed of what is happening.

The work of the Committee on Medical Research has certain high spots. There is an extensive investigation into new antimalarial drugs. Although there were few experienced in the experimental side of this work, chemical substances were collected from the large pharmaceutical manufacturers and were tested in different pharmacological and other laboratories which had not previously worked on bird malaria. In the meantime many chemists were stimulated to produce fresh compounds, both in commercial laboratories and in the laboratories of the public health service. The testing laboratories despite their inexperience overcame the difficulties very rapidly and were able to pick out active substances. These were next examined clinically and finally were submitted to field tests.

The Committee on Medical Research has been very active about penicillin. Prof. H. W. Florey paid a visit in 1941, to give full information on the preparation and on clinical results by then obtained. One or two large firms decided to go into production, and Dr. Norman Heatley, Professor Florey's colleague who accompanied him, remained behind to assist in this effort. Side by side with this production, the Committee on Medical Research arranged for carefully controlled clinical trials, the results of which enabled it to recommend a great extension of producing plant. This extension has been facilitated by the existence of brewing and other concerns thrown idle by war restrictions.

THE LAYMAN'S PART

The development of penicillin has also been facilitated by the enthusiasm for medical discoveries which exists in America among the general public. This enthusiasm about medical matters is something on which we would do well to reflect.

Discussions often take place whether British education is better or worse than education in the United States. So far as an intelligent lay point of view on medical matters is concerned, the Americans are far ahead of the British. This is revealed in the length and accuracy of the medical articles in the daily and weekly papers. When du Vigneaud determined the structure of biotin, the *New York Times* published a detailed article covering almost the whole of one of its more prominent pages. The liaison officer sent from London to Washington found it always worth while to watch the papers for early medical news. The Division of Medical Sciences of the National Research Council has a subcommittee on publication which is sometimes attended by four or five medical correspondents of the lay press. They attend in order that they may be informed of coming events; for example if some new large-scale inoculation of the army were in prospect, the correspondents would write about the advantages of this form of inoculation and warn people that there would be a proportion of reactions in sensitive subjects.

Immunisation against diphtheria and similar ailments is almost universal in America because the women understand its value. Her friends will compliment a mother on her baby now a few months old and point out that it will soon be able to have its inoculations. Schools will not accept non-immunised children as pupils. When the small number of schoolmasters in this country who have any opinion on such a matter is considered, we see perhaps most clearly how uneducated we are.

It has been said that some British officers are not inclined to take antimalarial measures seriously, and refuse to take mepacrine, saying that it is no good. This would be almost inconceivable in the American Army where the medical officer's opinion is taken as that of a well-informed man. Why this difference between the British and Americans should exist is difficult to say, but it is probably not entirely due to the ignorance of British laymen. It may in part be due to the superiority of American doctors. Ordinary general practice in some parts of America (New England, for example) is on a higher level of efficiency than general practice in this country. One explanation of this is the large part taken in experimental medicine by American clinicians in the last twenty years; the great majority of those in hospital are engaged in experimental work in the laboratory as well as in clinical work in the wards.

ACTIVITY AND ACHIEVEMENT

The Committee on Medical Research has encouraged the preparation of human albumin as a blood substitute. The process has resulted in the production of many side-products, such as measles antibodies and fibrin films. Much work has also been done on the factors affecting wound healing, in particular the part played by corticosteroids. Great attention has been paid to the prophylaxis of venereal disease, especially gonorrhœa, and to more rapid methods of treating syphilis. The American attitude to this problem is characteristic in that the Americans make their minds up quickly, as is surely important during a war. But because more rapid methods of treating syphilis involve a higher proportion of toxic reactions, it is unlikely that for some years to come the British mind will accept the idea that the much shorter stay in hospital of the majority of the patients more than compensates for the raised proportion of toxic reactions.

In war-time the difficulties of travel are considerable in Britain; in the United States they are now very great indeed, and it is therefore astonishing how much work is controlled from Washington in distant parts of the country. The organisation works very smoothly and reflects great credit on the Washington committee; in addition to some seven adjutants, each responsible for

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organisation in a particular field, Dr. Richards has the half-time or full-time help of his colleagues on the committee, Dr. Lewis Weed, Dr. A. R. Dochez and Dr. Baird Hastings. They make up a powerful team, together with representatives of the Army, the Navy and the Public Health Service.

The British liaison officer in Washington has the duty of keeping in touch with the Canadians, who have their own National Research Council in Ottawa. They may be justly proud of their war effort in the medical field, which has been great in proportion to the number of workers engaged. Important contributions have been made to our knowledge of aviation physiology, and valuable work has been done on clothing and on the diet of troops. The Canadians are responsible for the earliest investigations in the war on seeing and hearing at sea, and they have made notable advances in the preparation of typhus vaccine. Together with work on sea-sickness and the preservation of stored blood the achievement is remarkable.

Reconstruction

TROPICAL MEDICINE AND THE FUTURE

AMONG schemes of planning, tropical medicine occupies an exceptional position, as necessarily concerning itself with the health of the Empire and many complex problems which this conception embraces. London is the centre of a political organisation of which many countries are situated within the tropics where tropical diseases constitute a dominant factor. To study these effectively is at once Britain's right and urgent duty, and British achievements in this branch of medical science have been both important and fundamental. But a progressive and enlightened colonial policy in postwar years ought to make provision for still more extensive and intensive research in the treatment and prevention of tropical diseases.

In the metropolis the onus of this work will assuredly fall upon the London School of Hygiene and Tropical Medicine, and if the school is to add to its lustre in teaching and research, the more abstruse and theoretical technical subjects, such as protozoology, helminthology and medical entomology, must be linked to practical clinical medicine. Such a school without an affiliated hospital may be likened to a ship without a rudder. That is the position today. The Hospital for Tropical Diseases, upon which this service has so far devolved, has been destroyed by enemy action and it will be necessary to reorganise it in a modernised form. Unless this is done within a reasonable time the study of tropical medicine in London may languish, which is unthinkable. It is obviously impossible to stock a hospital in London with representative cases of all known tropical diseases, but it has been amply demonstrated in the past that enough clinical tropical cases are always available to provide material for clinical teaching and clinical research, if full use is made of the opportunities London's central position affords.

A NEW TROPICAL HOSPITAL IN LONDON

The aim should be to create an institution to which patients from the tropics may turn for specialised treatment, and where the diagnosis and treatment of tropical disease are understood and provided for. The hospital should be staffed by doctors who have been specially trained in tropical medicine, have had practical experience in the tropics, and have spent some years studying tropical problems. In the hospital there should usually be found cases of malaria, leishmaniasis, amœbiasis, sprue and the many intestinal affections which are prone to affect travellers in tropical lands. Experience has shown that patients invalided from the tropics cannot discriminate tropical from non-tropical affections, so that sufferers from all manner of diseases tend to seek treatment in such an institution, and its hospital service inevitably becomes a cross-section of what may be called the practice of medicine in the tropics. Herein lies the practical value of a tropical hospital of this kind. It provides an excellent means of instruction by the comparative method, the chief value of which lies in the sphere of differential diagnosis, with special emphasis on the parasitological and biochemical aspects of the case. The clinical features of malaria, for instance, can be contrasted with those of many other forms of pyrexia, splenomegaly and anæmia which are encountered in routine practice.

Clinical demonstration must be backed up by microscopic preparations of the parasites, slides illustrating changes in the blood-picture and pathological exhibits. The pictorial method of teaching, excellently displayed in the Wellcome Museum, lends itself particularly to the study of tropical disease. The equipment of the clinical teacher should therefore include not only a rich assortment of microscopic preparations but also pathological drawings, and whenever possible, cinematograph films. The main manifestations of amœbiasis, for example, embrace considerations of modern methods of investigation of intestinal disease and invite comparison with other forms of colitis and many other affections of the large intestine, such as malignant disease and diverticulitis. Many other examples will suggest themselves to those who have practised in the tropics; thus sprue and sprue-like diseases provide a never-ending topic for discussion. Then there are biochemical considerations. In no other department of medicine are these so significant as in the severe anæmias which are constant concomitants or sequelæ of tropical fevers.

REORGANISATION OF TEACHING

Several circumstances in the present situation must be carefully considered in planning the teaching of the future. First and foremost is the opening up of the tropics and many parts of Africa and Asia, which have hitherto been almost inaccessible, by developments in air travel. These facilities will doubtlessly bring from the tropics many more patients who require immediate transfer to temperate climates and special methods of investigation and treatment for their recovery. Far from reducing the number of tropical cases available in London, air travel is likely to increase them. Moreover, air travel should enable members of the staff of the central London hospital to visit other medical centres in the Middle East, in West, Central and East Africa, and even in India and the Far East from time to time to study new methods of diagnosis and treatment. This will undoubtedly lead to much closer coöperation in teaching and research with schools of medicine and laboratory workers in other lands, to their mutual benefit.

These many-sided developments will necessitate reorganisation of the clinical teaching staffs. No longer will it be possible for tropical consultants, engaged in busy and exacting consulting practice with many divided loyalties and duties, to conduct the main teaching in clinical tropical medicine. It is therefore necessary to envisage setting up a unit system in this such as is already established in other branches of medicine. A prime consideration will be the appointment of a full-time clinical teacher. Many duties will devolve on him. The institution of a chair of tropical medicine in the London school might solve many of the inherent difficulties of the present situation. A director of studies may also be needed for overseas students, who urgently desire such assistance. This officer should be well versed in modern medicine and should be able to direct research in special cases. The aspirations of overseas students, especially Africans and Indians, require special consideration in this respect. In addition to the teaching of postgraduates in tropical medicine, due attention may have to be paid to special students from the tropics and elsewhere overseas who come to London to work for higher degrees. In this direction this hospital for tropical diseases may well act as the tropical associate of the British Postgraduate Medical School.

In choosing a site for a new Hospital for Tropical Diseases due consideration must be given to the amenities afforded by the Port of London, whither normally the greatest number of tropical cases tend to gravitate. The hospital should be planned on broad lines and should have enough beds to provide ample material for instruction in clinical tropical medicine, bearing in mind likely future developments in this rapidly expanding field of medicine.

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A WAY WITH A BLANKET

Dr. D. BELL SMITH sends us a neat method of drawing a blanket, with as little disturbance as possible, under an injured person lying on the ground. The method is used by the Waltham Holy Cross Civil Defence Service, and was devised by Mr. H. P. Woolley, the ambulance officer.

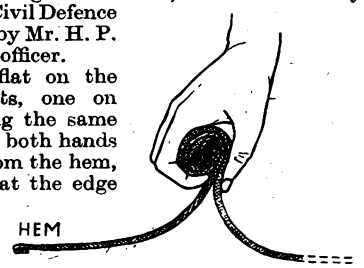

Fig. 1

The blanket is laid flat on the ground. Two attendants, one on each side of it and facing the same hem, take hold of it with both hands at a distance of 18 in. from the hem, their outer hands being at the edge of the blanket and their inner hands some 12 in. from the edge. They make a fold across the width of the blanket by lifting it slightly from the ground; then they roll the fold over towards the hem, until only 2 in. of the hem end of the blanket remains clear of the roll (fig. 1). The same plan is followed at the other end of the blanket (fig. 2). One attendant then brings the rolled blanket towards the injured man, with the two rolls at right angles to the body, one opposite the hollow below the buttocks (fig. 3). This attendant remains kneeling beside the patient, holding one roll of the blanket in each hand.

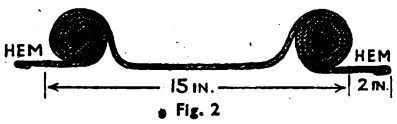

Fig. 2

The other attendant straddles the patient, facing his head, with one foot close to the thigh, well below the hip, and the other close to the body a little higher than the waist (leaving the buttocks free). He places his hands well under the patient, his left hand next his left foot and his right hand next his right foot. He then gently raises the patient's buttocks an inch from the ground and the other attendant pushes the rolls of blanket half way under the buttocks, goes round to the other side and draws the blanket through so that the patient lies over the middle of it. The patient is gently lowered on to the blanket, and both attendants then go to his head and kneel facing his feet. They steady his shoulders with their inside hands, and with their outside hands take hold of the hem protruding from the rolled blanket as close as possible to the body (fig. 4); gradually they pull the hem towards them so that the roll unwinds and the blanket lies quite flat under the patient's back, remaining puckered under the neck. One attendant lifts the patient's head, and the other pulls the blanket straight beneath it. They then go to the feet and repeat the process with the second roll puckering the blanket behind the ankles, steadying the feet and drawing it tight.

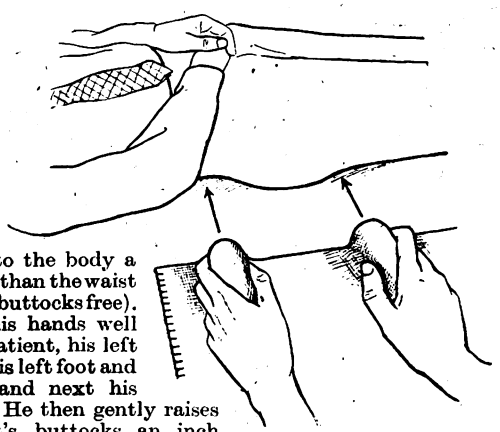
Fig. 3

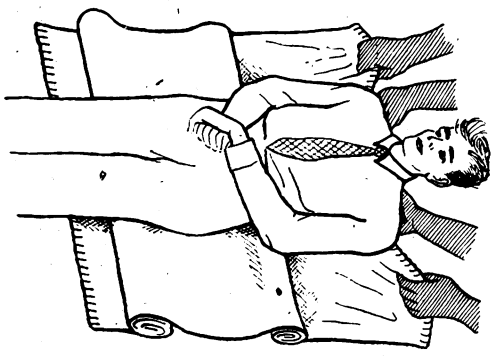
Fig. 4

In England Now

A Running Commentary by Peripatetic Correspondents

THE rise of the present type of consultant is one of the major disasters of British medicine. In past days nearly every consultant had a certain amount of very high-class practice, which kept before him the ways and ideas of general practice, so that he was often a much more useful consultant to the GP than he is today. As a result of cutting the consultant class off from practice and the way that junior doctors have no chance of becoming honoraries if they start in private practice, the present generation of consultants and teachers has really very little comprehension of the problems that the GP has to face, and none at all of those environmental and hereditary factors in disease which we are now being urged to study, just at the time when the suggested state medical service will probably make doctors change their location so often that they will never be in any place long enough to treat two generations and so see the effects of heredity. If consultants had kept their private practices they would naturally have impressed on their students the importance of these factors and the need of the human and social approach. They might have been less narrowly scientific but they would have been much more broadly effective as teachers and therapists. Consultants now rarely see a patient unless he has already come under the influence of two of the strongest therapeutic measures known—hospitalisation and the aura of a specialist. As a result they often cannot even see the faults that we GPs see so clearly—even Venus is lost in the blaze of the sun. In the same way students are brought up to learn medicine in wards and outpatients. They therefore long for health centres, visiting consultants, &c., when they get into practice. I have no grouse against these, but they do not begin to touch many of the problems we have to face and grapple with as best we may. The environmental and human side of medicine should not have to be learned as specialties. They should be the very pith and core of all instruction—the patient should be seen as a sick man, not as a conglomeration of special systems. And so he would be if our consultants either kept up some private practice or had to have, say, five years practice before they were allowed to get on the staff of any hospital or teaching institution.

* * *

Even when I was a youngster, I often marvelled at the apparent credulity of railway companies and municipal authorities who posted at bridges and level crossings a foolscap sheet of by-laws printed in extremely small type. In these days there is a better understanding of the psychology of the reading (or non-reading) public. The pictorial sign is at a premium, especially the "clever" one—the kind that makes the pedestrian feel that he is a singularly gifted fellow who can take in the significance of the design at a glance: the S-shaped bend, the torch to represent a school (and the consequent danger of children playing in the road), the model locomotive. With the CMF one is impressed by the chattiness of the road signs which aim at preserving the 8th Army—lest they dash their foot (or something else) against a stone. No doubt the military police realise that a driver in a convoy who has been plodding along at 20 m.p.h. all day is not in a very receptive state of mind Thus they anticipate the reasonable desire of the driver to stop at the town which he sees on the horizon, for they know only too well that the sedentary worker is liable to find his way to the glamour girls if he should leave his truck for half an hour. As the driver is dwelling on the prospects which lie ahead he sees a large poster on the roadside bearing the single word YES. He is roused from his pleasant reverie; what the —— does that mean? Comes the answer 50 yards later: IT'S OUT OF BOUNDS! Those who would ordinarily turn a deaf ear to "all this bunk about mepacrine," make good resolutions after they have received the staccato phrases conveying the news that they are now travelling in a highly malarious district. One of the best series of roadside messages that I have seen began by announcing that saboteurs were very active in the area. Full details were forthcoming: these wretched saboteurs were burning petrol, destroying rubber, damaging machinery . . . and then came the query for the truck driver: *Are* you *a saboteur?* Amid characteristic Italian

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scenery, when I felt as far from England as ever I did, I was startled by a poster bearing this announcement: *You are 980 miles from Marble Arch.* Then, as though revealing the destination of our convoy came the second poster: *Dispersal point—Hyde Park Corner.* That set my imagination on fire. Would'nt it be splendid . . ? The third and final message in this series suddenly loomed up in huge white letters—DRIVE CAREFULLY AND GET THERE! * * *

The lady sitting over there
(With proptosed and unwinking stare)
Is thyrotoxic. Though not hot
Notice that she perspires a lot.
If you should chance, upon the sly,
To knock her knee as you went by
(I recommend you take the risk)
You'd find her knee-jerk rather brisk.

If you sat next to her and dared
To take her hand you'd think her scared
For 'twould be trembling; her pulse-rate
Might rise to giddy heights; a state
Of palpitations in the chest
Would come upon her if you pressed
Her fingers. Don't be over-bold,
Her feelings cannot be controlled.

Though she (it cannot be denied)
Eats like a horse, something inside
Must take all value from the food.
It never does her any good.
Only her neck's circumference
Enlarges fast at her expense.

All told, the thyrotoxic state
Is one, I fancy, she must hate.
So whisper to her, ere you go,
In case her doctor doesn't know,
That a new cure for goitre's made
Which may put surgeons out of trade.
Suggest she tries a daily pill—
One gramme of thiouracil.

* * *

One feels ashamed to admit being the better for the war. Not indeed financially, though I suppose there are some of whom that is true, for in spite of Government efforts against them wars will always breed profiteers. No, the improvement that I notice is bodily and mental, and it strongly supports Dr. Parkes Weber's views. The shame arises because there is no reason, except in oneself, why it should have needed a war to bring these benefits. It has needed a war to show me that in peace-time I ate too much. There must be thousands of men and women in the middle class to which I belong who have learnt the same. Having lost a stone in weight I not only feel more capable but have proved myself to be so. Though I am over sixty I can now with pleasure and benefit trot my terrier for a mile before breakfast round the grass of the neighbouring park and thus get a sniff of fresh air and a sight of the early morning which I had not enjoyed for many years. Every meal now I relish to the utmost, but there is no feeling of repletion and no hint of indigestion. Often in peace days I had both. Mental improvement comes with the bodily advantage. One is less sleepy in the daytime and gets through work more rapidly but with no less efficiency. What I am wondering is whether when peace and plenty return we will still eschew the attractive little extras to keep our positive health. We have learnt in war-time that a two-course dinner is enough. Shall we, when we can, go back to four courses? Shall we be content with meat or fish followed by a sweet or cheese, or shall we linger again over the additional entrées and dessert? Shall we be content with our modest half pint of bitter, or shall we supplement it, deliciously but mistakenly, with that glass of port?

* * *

Mrs. Smith in the maternity ward was puzzled by her curly headed babby. Her own hair is straight as the proverbial yard of pump water; so is her husband's. "I don't understand it at all," she said, "there ain't no curly hair on either side of our family. Do you think it could have been that perm I had when I was carrying her? It never took on me, but perhaps it took on her instead, like Mrs. Jones's opening medicine."

Letters to the Editor

THE MEDICAL CURRICULUM

SIR,—For the last twenty years or more there have been many expressions of dissatisfaction with the curriculum, in general because of its complexity and in particular because it overburdens the student's mind with dissociated facts and fails to give him any clear picture of what he is studying. The curriculum is not specifically a course of study devised by the teachers in medicine as the best form of training to produce the best doctors, but is basically the product in aggregate of the requirements of the various licensing bodies who seek recognition of their degrees and diplomas from the General Medical Council. The teachers are therefore the slaves of the curriculum rather than its masters. Hence while it is possible for further courses of study to be added to the curriculum, there does not appear to be any machinery for removing anything from it. It is surely time that this rather quaint state of affairs should be closely examined with a view to rational correction. There is already on foot a movement to simplify the courses of the premedical studies so that students may have a longer period of general education—a movement checking the increasing tendency to that early specialisation which leads to the production of technicians and not of critical thinkers.

Unless something practical is done soon, the outlook for the medical student will become impossibly difficult. Social medicine, so ably presented in the interim report of a committee of the Royal College of Physicians, provides him not only with an additional subject but with a complete new curriculum to be clamped on to the existing one. Courses on the rehabilitation of the industrial sick are contemplated; additional pædiatric studies are essential, so it is said; there must be more psychology; and the study of the chronic sick can no longer be neglected. And as the idea is dawning that the health of crops may influence the health of the population which eats them, it is reasonable, on precedent, to demand that the student shall do at least six months' farming.

It is clear that the time has arrived when the teachers in medicine must devise a curriculum de novo. At present medical education regards man too much as either dead or diseased; for the future he must be considered as essentially living and healthy. The curriculum must be a living study of his body, his mind and his environment and of their reactions upon each other so that his diseases must come to be considered as a part rather than as the whole of the subject matter.

There will be a difficult and perhaps lengthy period of transition; but no advance can even be contemplated unless the existing curriculum is reviewed now so that some start may be made in removing much that has little value and introducing new matter gradually. This revision must be carried out by a body representative of the active teachers in all medical subjects, and it should keep the curriculum under constant review so that its revision, while progressive, is also controlled and its parts correlated in a reasonable and orderly manner. We are planning the new medicine for the postwar world, but of what use is it to build a new organisation on foundations which have already stood condemned for many years? The doctors of the future must be new doctors, with a new outlook derived from a new training based on new methods.

Charing Cross Hospital Medical School. H. W. C. VINES.

SIR,—I read with great interest Professor Platt's suggestions for undergraduate teaching in the *Lancet* of Jan. 15. It might be advantageous for undergraduates to serve an apprenticeship with a general practitioner during the long vacations in the 3rd and 4th years of their medical study. Such an "apprenticeship" would give the undergraduate some idea of the conditions and problems encountered in general practice and would bring undergraduate teaching into proper perspective.

A. RONALD.

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SHALL BASSINI DIE?

SIR,—I read with interest your leader of Jan. 8, and although I have not had an opportunity of reading Edwards's article in the *British Journal of Surgery* I should like to reply to one or two of the points you quote :—

(1) It is my experience that in the common congenital indirect type of inguinal hernia there is no lesion of the fascia transversalis except perhaps an enlargement of the internal abdominal ring. I cannot see the value of attempting to repair a defect which does not exist. The primary lesion in this type of hernia is the presence of a sac, and removal of this sac is the cure of the condition ; but—and this is the important point in my view—many of these cases have in addition either an underdeveloped conjoined tendon or a congenitally deficient one, and it is this gap between the free edge of the conjoined tendon and Poupart's ligament which must in some way be filled in so as to prevent the occurrence of a direct hernia. To my mind there are three cardinal points to remember in executing this repair : firstly there must be the least possible tension on all the structures concerned ; secondly the stitches must be tied as loosely as is compatible with obtaining the desired result ; thirdly the gap I have mentioned must be filled in with some kind of fascial graft. Neglect of these three essentials is the cause, I am convinced, of the many failures of the Bassini technique. With a direct hernia the lesion is different in that there is a definite weakness and sometimes rupture of the fascia transversalis, and the fascia itself must of course be repaired as it is the primary lesion in these cases, even as the sac is the primary lesion in the indirect cases.

(2) Edwards finds the muscle of the conjoined tendon, in his cases of recurrent inguinal hernia, to be "a thin sheet of attenuated muscle"! I have already mentioned the failures in technique which account for a number of these cases, but it should be noted that the conjoined tendon is often a very attenuated structure in the first instance—not only attenuated, but quite frequently deficient.

(3) You mention that Edwards recommends either the turning over of a flap of the anterior layer of the sheath of the rectus muscle, or a Gallie fascial graft to close the deficiency in the fascia transversalis. I would suggest that the McArthur fascial graft from the external oblique is equally good, for the following reasons : (*a*) the rectus sheath is not damaged ; (*b*) it is quite possible to cut two strips, one from each edge of the incised external oblique, and so there is no lack of graft tissue ; and (*c*) the lateral edges of the graft lacings can be stitched together forming a complete fascial sheath. The McArthur graft is less destructive than the methods Edwards advises, and is likely to be more effective when used in accordance with the three principles set out in paragraph 1 governing closure of the gap between the conjoined tendon and Poupart's ligament.

Finally I agree absolutely with your notes on Edwards's concern with results rather than methods. As I said in my original paper the operation for repair of inguinal hernia can hardly be taken too seriously, nor can it be emphasised sufficiently that each case is a problem in its own right, requiring consideration of the type of repair to be undertaken, the anæsthetic to be used and (in ideal circumstances) the time of year in which it should be done. Adaptability is as essential in this as in any other surgical field.

HUGH R. ARTHUR.

SIR,—I observed with much disappointment and surprise that no mention was made in your leading article of the valuable filigree method. For 10 years before 1938 I tried most of the procedures designed to reinforce the inguinal canal, including those mentioned in your article. I found repair with the Gallie fascial graft, in my own hands and those of others, not free from recurrences. Five years ago I began to use filigree reinforcement, by Cole's modification of the McGavin technique. At first I reserved it for large scrotal hernias, direct hernias and recurrences, but later I extended its use to cases in which, in my opinion, the poor condition of the musculature of the inguinal canal invited recurrence, such as the feeble atrophic conjoint tendon. In all, 56 cases have been treated in Bethnal Green Hospital, with only one small recurrence in a case which had been operated on elsewhere before. Some of the scrotal hernias have been in people over 60 years of age, and some have been as large as a fœtal head. Most of the patients have been drawn from the local population, which is more or less static, and the great majority of them have presented themselves for a careful follow-up. I have a paper in preparation going more fully into the matter. The results in my own series are borne out by those of other workers in this field. It is a method applicable to all ages, and in the hands of the average competent surgeon, who adheres strictly to the McGavin-Cole technique, recurrences should be exceptional, and if they do occur are easily repairable.

Bethnal Green Hospital. W. PICKUP GREENWOOD.

SIR,—I should like to record the following observations before you order the hearse.

During the past 30 years I have operated on many hundreds of inguinal herniæ. In the earlier years I began with Bassini ; I dropped that in favour of Halstead but changed back to Bassini about 15 years ago and have continued it ever since. I gave up the Halstead method because I found it very difficult in this operation to make a good job at the inner end of the inguinal canal, where the cord emerges from beneath the internal oblique and transversalis. I was getting many more recurrences than with the Bassini. My recurrence-rate now in the latest hundreds is nearer 3% than the 12–20% you quote.

So that there may be no ambiguity in my remarks I am referring only to the more usual types of inguinal hernia found—

Indirect—

1. Congenital : sac wrapped round constituents of cord ; horseshoe-shaped on section.
2. Acquired : sac a flat pocket laid on cord.

Direct—

3. Lenticular (common) : no sac, merely a weak place in the posterior wall of the canal giving a saucer-like elevation on coughing.
4. Tubular (rare) : sac a finger-like tube with fairly thick walls.

Early indirect herniæ of either type in young patients scarcely ever require any further treatment than complete removal of the sac with transfixion and ligation of its neck high up. Late indirect, with considerable dilatation of the internal ring, and both forms of direct herniæ, require some kind of repair of the posterior wall of the inguinal canal. This is, of course, the crux of the question and it may as well be admitted at once that no one method is satisfactory for all cases.

The chief objection to the Bassini method is that suturing the internal oblique and transversalis to Poupart's ligament distorts its inguinal musculature and pulls the fibres of the muscles out of their line of action. If you accept the idea of a sphincteric action of these muscles, whereby during contraction they shut down on or meet a simultaneous elevation of Poupart's ligament, then I think the objection is ill founded. I have observed this sphincteric action on many occasions and there appears to be no doubt of the accuracy of the description. In suturing the relaxed fibres to Poupart's ligament you do not have to pull them down, and in action, as we have seen, they are pressed down on Poupart naturally. Wherein does this "offend against pathological, physiological and anatomical principles ?"

What I think is probably more important is the suturing of the transversalis fascia not only to the inner side of the deep epigastric vessels but also around the internal ring. This fascia is not always a separate sheet but is more often incorporated with the transversalis muscle ; hence the necessity for suturing the muscle also if it is to be properly done. This does not mean taking wide bites of the muscle and fascia but only the strong edge of the latter which is commonly present beneath the muscle. I have no doubt that the atrophy of the muscles described by several writers is caused by too wide suturing and consequent strangling of the muscle-fibres (Hercules in chains).

I have found this repair of the inguinal canal highly satisfactory and have only very occasionally used Gallie's fascial darning method when by reason of age, debility, &c. the local tissues were inadequate. If I had time I could show that all other methods so far proposed

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are definitely inferior to the Bassini method. To mention only two, Willys Andrews or Gallie's, using strips from the external oblique, both fail in bad cases because the external oblique is quite inadequate for the purpose, apart from the fact that no amount of suturing here will prevent rupture through the essential layer—the transversalis fascia. In other cases these are waste of time. For similar reasons the triangular flap from the rectus sheath is unsound.

Needless to say, the above is not the whole story and equal stress must be laid on many other factors—adequate exposure; clean dissection; complete hæmostasis and asepsis; reducing the size of the cord; and 2½ to 3 weeks in bed.

Two other measures have received much less attention; I have practised them for years and I believe they are largely responsible for what success I have had. One is to use *continuous sutures* instead of interrupted. Unless interrupted sutures are very close they must leave gaps between them. It is not uncommon to see surgeons content with only two or three interrupted sutures in suturing the transversalis to Poupart. Incidentally, I have always used no. 2 catgut and have always reckoned that the critical period was between the 10th and 20th days, when the catgut is softening and the tissues are not firmly healed.

This leads me to the second special measure—*abdominal exercises*. These can be started gradually from the second day after operation and if properly performed the patient's abdominal wall is fairly safe by the 10th day onwards. At first, while lying on the back the head only is raised several times a day, and then gradually the patient tries to sit up, at first only making a gentle attempt and so on till about the 7th day when he can begin to do so properly. The arms must be folded on the chest, and must not be used to push off from the bed. When the bed is being made and at other convenient times *both* legs with knees extended are raised slowly and steadily off the bed, at first a few inches and then gradually increased up to the vertical and slowly down again. If you can persuade the patient to continue these exercises when he gets home you are to be congratulated, for I believe they are specific against recurrence.

Liverpool. H. C. W. NUTTALL.

THE BIGGER CHRISTMAS GIFT

SIR,—It is with great pleasure that I inform you that we were able to give £3 to each of our regular beneficiaries at Christmas, which amounted to £1566, and in addition to distribute £2 on New Year's day as "a special surprise" to 50 of our poorest folk, the total distribution of gifts being £1666.

These figures cannot reveal the amount of happiness and good cheer brought to 522 homes, but it can surely be imagined and the gratitude of many is very touching. Will you please convey to your readers my heartfelt thanks for their generous response and support of my appeal. I am deeply grateful to all. Many may see from this Christmas Gift distribution what great and useful work the Royal Medical Benevolent Fund is doing throughout each month of the year. Will those who do not already subscribe to our general funds not forget our work in 1944.

THOMAS BARLOW,
1, Balliol House, Manorfields, S.W.15. President, RMBF.

MYELOGENOUS LEUKÆMIA COMPLICATING PERNICIOUS ANÆMIA

SIR,—The case described by Dr. Woolley in the *Lancet* of Jan. 15 is one of the rare proved cases of a combination of two blood dyscrasias one of which is considered to be a deficiency disease, the other very probably being of neoplastic character. Only cases satisfying the diagnostic requirements I set out in 1939 (*Sang*, **13**, 803) can be safely diagnosed as being a combination of a true leukæmia and a true pernicious anæmia. In view of the different pathogenesis of these two blood diseases, as far as our knowledge goes, a pure coincidence seems the easiest explanation of this concurrence, but certain facts deserve consideration. These are that some unknown constitutional factor plays an undeniable rôle in the production of pernicious anæmia; that leukæmias may rarely be familial; and finally that leukæmia and pernicious anæmia may be found in the same family. (For myelogenous leukæmia and pernicious anæmia see Strandell and Lemming and Schumann; for lymphatic leukæmia and pernicious anæmia see my observation in two sisters, quoted in my 1939 article where I also report the coexistence of chronic lymphatic leukæmia and pernicious anæmia in the same person.) Though "inferiority" of the hæmatopoietic mesenchyma or "heterologous disposition" to different blood dyscrasias is not an explanation, it may point to something more than mere coincidence.

Hammersmith Hospital, W.12. S. VARADI.

HOME-MADE PENICILLIN

SIR,—In your annotation of Jan. 8 you rightly draw attention to the difficulties and risks attaching to the use of crude penicillin wound dressings. In view, however, of the proved value of penicillin in wound treatment and the urgent need of ensuring its utmost availability we recently undertook to try out the method of Robinson and Wallace with all possible precautions to avoid danger. We have been using dressings of absorbent gauze impregnated with a living growth of *P. notatum* prepared by proper laboratory methods and under the care of a trained laboratory worker. The activity of these dressings is constantly tested against a strain of *Staph. aureus* both by a "halo" plate test and by broth inoculation. All wounds treated have been superficial and infected with a heavy growth of the commoner pyogenic organisms with much pus formation. The dressings of penicillium gauze have been placed straight on the wound and held in place by gauze and zinc oxide strapping. These dressings have been left on for 5–7 days and repeated if necessary. In all cases (about 20 to date) the results have been spectacular and no untoward symptoms of any kind have arisen.

At present various media are on trial. When further information has been collected we hope to publish a full account of the method of preparation of the "penicillin pads"—the cost of which does not exceed a few pence each—with a detailed analysis of the clinical results. In the meantime we will willingly communicate the technique at present used to any workers who have the facilities and inclination to give it a careful trial.

The use of "natural" penicillin in no way lessens the need for intensive chemical research with a view to securing the concentrated product more cheaply and if possible by chemical synthesis. But the war may be long over before sufficient concentrated and cheap penicillin is available for general use. In the meantime the method described above has given such remarkably successful results in the treatment of septic superficial wounds that we feel a wider test is desirable.

A. J. HOBSON.
Wimbledon. L. D. GALLOWAY.

POSTGRADUATE DEGREES

SIR,—It is perfectly true, as A Service Medical Officer states (*Lancet*, Jan. 1), that many men had been unable to sit for higher qualifications on account of the war, but I think Sam Weller is under the impression that the qualification MRCP automatically renders one a specialist in medicine. All credit to those men who do obtain it six or twelve months after qualification, but it simply means that they have had the time and industry to cover a wide field of reading and have been able to apply it: they are no more specialists than they were just after qualification. It is to be regretted in some ways that the Royal College of Physicians does not insist at least on a candidate holding a succession of different appointments taking up to three years, before he is allowed to sit for the examination; these might include six months general medicine in a teaching hospital, six months fevers, six months tuberculosis, and six months psychiatry—especially the last.

The present-day attitude seems to be to get the higher qualifications as quickly as possible, and then to be considered a specialist, when only years of practical experience in medicine can make that status possible. The older teachers who are now retiring did much extensive clinical work, before they were considered specialists; but today this is not the case, and not only is it to be deplored, but it should be remedied.

Lancaster. NORTHAGE J. DE V. MATHER.

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SENSORY EFFECTS OF WOUNDS

SIR,—Mr. Burrows begins his article of Jan. 15 by saying that nearly everyone knows that people who are being mauled by lions or other animals commonly feel neither pain nor fear. Though a South African who has studied an abundance of wild life, I am not prepared to say whether this is true or not. But Mr. Deneys Reitz, now High Commissioner for South Africa, in his new book *No Outspan*, writes as follows (p. 71):

"At Mtimba I met Wolhuter. A lion had pulled him from his horse and as he was being dragged away he managed to unsheathe his knife and he plunged it into the animal's heart.

"David Livingstone, who was also mauled by a lion, says in his book that he experienced neither pain nor fear. He propounds the theory that this was due to a merciful dispensation of Providence by virtue of which a mouse in the jaws of a cat, or any other creature seized by a beast of prey, undergoes a numbing of the senses and a deadening of pain. . . .

"I asked Wolhuter as to his sensations at the time. He said that so far from feeling no pain he suffered excruciating agony, and as for his senses being numbed, every nerve in his body was tense with horror."

Guy's Unit, EMS. GEORGE R. W. N. LUNTZ.

MENTAL HEALTH SERVICE

SIR,—The mental health of the nation is of paramount importance and the future organisation of the mental health services merits careful thought. Last year, when it appeared a matter of urgency to present the Minister with some considered ideas on the subject, the Royal Medico-Psychological Association like other bodies prepared its tentative recommendations.

Now, with rather more breathing space, the Association has set up a new planning committee, under the chairmanship of Brigadier J. R. Rees, designed to represent every branch of the specialty. It is hoped that in each division of the Association a local committee will meet to discuss and represent the views not only of the members of the RMPA but also of any, or all, psychiatrists in that area. The committee thus hopes to receive a number of considered plans, but in addition will welcome all relevant suggestions put forward by any group or by individual physicians.

All such communications can be sent to me, anonymity being preserved if desired.

W. GORDON MASEFIELD,
Hon. Secretary, Medical Planning Committee.
Royal Medico-Psychological Association,
11, Chandos Street, W.1.

COUPONS FOR BELTS

SIR,—I shall shortly be celebrating the first anniversary of my colostomy, and have just despatched three clothing coupons for my third colostomy belt. Two belts are a necessity with a colostomy as ill-behaved as mine, and their life seems to be about a year. Colostomites, perhaps, need not be as dressy as other people, but (as the Minister of Food recognises in granting us an extra soap ration) our underwear needs more washing and therefore lasts less long. So don't you think, Sir, that colostomy belts should be coupon-free? Maternity belts are, and I suggest that they are no more essential than ours.

ORION.

*** No coupons are required for a surgical belt not more than 6 in. wide at the widest part (*a*) to which is attached a pad, cup, chute, disc, plate or metal frame; or (*b*) specially designed and supplied for use in appendicostomy, cæcostomy, cholecystostomy, colostomy, cystostomy, gastrostomy, ileostomy, jejunostomy, nephrostomy or ureterostomy. For example, the belt described by Dr. Knight in the *Lancet* of Jan. 15 is coupon-free.

A knitted or woven body-belt without fastening or inner lining and not containing elastic or inner lining requires 2 coupons and other surgical belts (apart from certain maternity belts) require 3 coupons each. It has not been possible to release wider surgical belts from coupons because when they were coupon-free many people who did not need a surgical belt wore one in place of a corset.—ED. L.

SULPHONAMIDE DERMATITIS

SIR,—The photographs which accompany Tate and Klorfajn's article seem to be typical cases of pellagra dermatitis. If this is so, the explanation for it is given in your annotation of June 26, 1943, in which the antagonism between nicotinic acid and the sulphonamides is discussed. Perusal of this annotation will make the mechanism underlying Tate and Klorfajn's cases clear, and point to the remedy.

Tooting Bec Hospital, S.W.17. E. P. EVANS.

PLANTAR WARTS

SIR,—I was interested in the simple treatment recorded in your annotation on p. 94. There is another even simpler treatment which you do not mention. Elastic plaster bandage wrapped round the foot, and renewed each time it becomes loose or uncomfortable, removes the warts in from 5 to 11 weeks. I have used this method for many years now, and have not known it fail.

Beaminster. R. E. HOPE SIMPSON.

BISMUTH PREPARATION FOR SORE THROAT

SIR,—In your issue of Jan. 1 Mr. Lloyd told of good results he had had with bismuth treatment of sore throats. I would like to recall my own similar experience (*Lancet*, 1940, ii, 636) of the efficacy of a single injection of bismuth in the treatment of "shelter sore throat" which was epidemic at that time. Good results were also obtained in America by James F. Lewis (*J. Arkansas med. Soc.* 1941, **38**, 39).

French Hospital, W.C.2. S. GALEWSKI.

Public Health

The Third Quarter

DURING the quarter ended Sept. 30, 1943, 169,348 live births were registered in England and Wales—the highest figure for that quarter since 1926. It brought the birth-rate up to 16·2 per 1000, while the infant-mortality rate was 40 per 1000—the lowest quarterly rate ever recorded. The proportion of boys to girls increased during the third quarter, as commonly happens in war, reaching 1070 boys to every 1000 girls, the average for the ten preceding third quarters being 1053. Marriages fell off; 81,454 was the lowest figure for any third quarter since 1918, while the rate (15·6 people married per 1000 population) was the lowest since 1917—i.e., towards the end of the first world-war. Deaths were about steady, numbering 98,509, with a rate of 9·4 per 1000 as compared with 9·3 for the same quarter of the previous year.

Infectious Disease in England and Wales

WEEK ENDED JAN. 15

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 1747; whooping-cough, 2023; diphtheria, 673; paratyphoid, 4; typhoid, 1; measles (excluding rubella), 559; pneumonia (primary or influenzal), 1294 (last week 1617); puerperal pyrexia, 152; cerebrospinal fever, 64; poliomyelitis, 9; polio-encephalitis, 0; encephalitis lethargica, 1; dysentery, 175; ophthalmia neonatorum, 78; No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Jan. 12 was 1753. During the previous week the following cases were admitted: scarlet fever, 124; diphtheria, 41; measles, 35; whooping-cough, 83.

Deaths.—In 126 great towns there were no deaths from measles, 1 (0) from an enteric fever, 2 (0) from scarlet fever, 14 (1) from whooping-cough, 16 (1) from diphtheria, 61 (13) from diarrhœa and enteritis under two years, and 197 (19) from influenza. The figures in parentheses are those for London itself.

Merthyr Tydfil reported the fatal case of enteric fever. Birmingham had 14 deaths from influenza, no other great town more than 7. There were 7 deaths from diarrhœa at Birmingham and 6 at Newcastle-on-Tyne.

The number of stillbirths notified during the week was 195 (corresponding to a rate of 30 per thousand total births), including 14 in London.

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Parliament

ON THE FLOOR OF THE HOUSE

MEDICUS MP

THE House has reassembled with a lot of work before it and is to sit for an extra day a week up to Easter. But of definite bills embodying proposals for social security based on the Beveridge report there is as yet no sign. Nor is there any sign of concrete proposals for dealing with the medical and general health services of the nation. The Beveridge white-paper will be issued some time and the earliest date I can hear of for the medical report is about the middle of February. As the procedure nowadays is first discussion as a white-paper and then the drafting of a bill and its presentation to Parliament we seem to be still a long way from definite decisions. The Medical Parliamentary Committee is considering the proposals of the Medical Planning Commission, but until the Government's proposals are known they are working under a severe handicap.

The session opened with the consideration of the Disabled Persons (Employment) Bill by which it aims at providing all persons disabled in the war with employment. Indeed the bill does not stop there, it embraces all persons who are disabled "on account of injury, disease or congenital deformity." And in the discussion on the committee stage the Solicitor-General made it plain that this applied to mental and physical defects, and a government amendment was introduced to make certain that any congenital abnormality would come under the scope of the bill. This measure therefore lays down for the first time a standard of security of employment for everyone able to maintain themselves outside an institution. The war has shown that given full employment this standard is possible.

The second big item on the agenda of Parliament in its first week of work was the consideration of the Education Bill. This was presented by Mr. Butler in a speech of an hour and fifteen minutes of quietly phrased but lucid exposition. The discussion turned largely on the maintenance of the dual system of control and on religious teaching. The compromises now put forward have been carefully worked out during two years of negotiation with the churches and representatives of all shades of religious opinion. They represent a delicate balance between the views of the Church of England (who control more than half the schools in the country, but not half the number of pupils), the Free Churches and the Roman Catholic community. Government and back-bench speakers alike emphasised that if the balance were upset it might wreck the bill. Opposing views on behalf of the churches were freely and fully expressed in the debate, but the second reading of the bill was passed not only without a division but without any challenge. Amendments may be moved on behalf of the Roman Catholics in the committee stage to increase the grant to be given to the voluntary schools, but in the second reading debate Parliament seemed of the opinion that the compromise embodied in the bill was generous and fully acceptable to most of the denominations. The settlement of the religious controversy which is at least in sight will enable the whole of the energies of those concerned to be devoted to the heart of the matter which is the great extension of educational opportunities which the bill offers. The school age is to be raised to 15 by April 1st, 1944, and to 16 as soon after as possible. Above the age of 15 and 16 young peoples' colleges are to be provided, and the medical services are to be extended to these young people. The provision of meals now covers about a quarter of the child population of the country and is being extended. The value of the school meal and the conditions in which it is given vary. Conditions in London are unfortunately not so good as in some other educational areas owing to greater difficulties with regard to premises. And in some areas meals are not all that could be desired. The foundation of a medical service with increased facilities for treatment and of a meals service which will secure a good and universal standard of nutrition are another plank in the fabric of social security in the future.

FROM THE PRESS GALLERY

Health Services in Schools

Mr. R. A. BUTLER, president of the Board of Education, in moving the second reading in the House of Commons on Jan. 19 described the new Education Bill as a complete revision of the law for dealing with the handicapped child. There had been few changes since the acts of 1914, 1918 and 1921. Under clause 32 of the present bill a duty was laid on local education authorities to ascertain all children who because of disability of mind or body needed special attention. It was proposed to abolish certification under the Mental Deficiency Acts for education purposes. No child who could be dealt with within the education system should in future be described or treated as mentally defective. Only those who could not be educated, and those likely to need care and supervision after leaving school, would be reported to the mental deficiency authorities. Apart from the provisions of clause 32 the various categories of handicapped and backward children for whom provision should be made would be defined in regulations. This flexibility would enable advantage to be taken of new developments in medical education or psychological diagnosis and practice as they came along.

Clauses 8 (2) and 31 (2) contemplated that children with slight disabilities might be taught by special methods adapted to their needs in ordinary primary and secondary schools, but for the more seriously disabled the Board of Education looked for an extension of the present inadequate provision of special schools both through local authorities and voluntary endeavour. Special powers were being taken to give more financial help to voluntary endeavour. Among other proposals and changes parents were given the right to ask for the medical examination of any child over the age of 2 with the object of providing special educational treatment.

Another human aspect of the bill, continued Mr. Butler, was the provision of meals and medical treatment. Parliament was again being asked to reform a law which dated from nearly 40 years ago when the foundations of the school medical service were laid in 1907. The present bill imposed a duty upon authorities to provide meals and milk and this was one of the sections of administration which appealed to him most, because one could actually see the worth of the investment in the children. The terms of this clause were drawn broadly because the Government's decision on the conditions governing these services might have to be adjusted at some future date to the decisions on family allowances and the question of family allowances in cash or kind.

Clause 46 proposed that local education authorities should be under an obligation to see that all children attending school or a young people's college maintained by them should be able to obtain every form of free medical attention other than domiciliary treatment. There was an innovation by which parents would be under an obligation to submit their children to medical inspection and every effort would be made to enable children to take advantage of modern medical and dental treatment. There was no foundation for the fear that the bill would deprive local education authorities of the responsibility for medical treatment and confine the work of the school medical officers to medical inspection. Cause 46 was likely to give school medical officers and staffs a greater responsibility for the treatment of children. Here again this policy would "cog on" to later Government policy as it came along. With the development of the new national health service the Government trusted that the duties of school medical officers would be widened, and the school medical service would become part of the general health services of the nation.

Perhaps the biggest change in this sphere of medical education would be regular and careful inspection of boys and girls who had left school and entered employment. These children were the most susceptible to certain illnesses and to the unaccustomed strain of their new working life, and yet at present there was no continuation of the medical service to look after them. The coöperation between the school medical staff and the agencies for advising young people on the choice of employment and physical welfare was centred by this bill in the young people's colleges.

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Notification of Venereal Diseases

Dr. EDITH SUMMERSKILL regretted the refusal of the Minister of Health to take more effective action than his predecessor to reduce the incidence of venereal disease. She recalled that six months after regulation 33B had come into force only 2 men and 64 women had been informed against. Men were willing, she concluded, to disclose the source of infection but women were very reluctant to do so. To make notification compulsory, they had been told, would be to drive the disease underground. Had 33B brought it to light? The disease was underground and experience with 33B was proof of that.—Dr. HADEN GUEST, who had been among the supporters of the regulation, thought that its complete failure up to date was partly due to insufficient vigour in its administration. Health authorities, unfortunately, were often not particularly interested in the prevention of venereal disease. Unless the Ministry was preparing to make notification compulsory, the lax administration of the regulation should be explained. His own experience as divisional officer in France during the last war pointed to the prohibition of the drinking of spirits.—Dr. H. B. MORGAN said that all over America wherever compulsion had been tried it had failed.—Miss HORSBRUGH, replying for the Minister, explained that the difficulty with venereal disease was that it did not incapacitate those who contracted it; many of them were unaware they had it or what it led to. The point to decide was simply how to get more of them to come for treatment. We must go on stirring up the local authorities to play their part in letting knowledge grow. Regulation 33B was but a small adjunct in the campaign; notice was only served on the individual who had rejected every persuasion to come forward for treatment. If compulsion would help they would compel; but at present the Minister thought more people would come under treatment without it, if we spread knowledge and maintained secrecy.

Rations in Occupied Europe

On Jan. 18 Mr. DINGLE FOOT said the latest available information was as follows:

France.—In October, 1943, owing to a much improved wheat crop the bread ration was increased by approximately 6 oz. per head per week. Normal consumers, children, and certain other categories receive the benefit of this concession, the only exceptions being workers already in receipt of supplementary bread rations. At the same time the milling extract percentage was reduced and it was found possible to dispense with some of the substitutes which had been used to eke out supplies in the pre-harvest months. There has also been a slight improvement in the sugar allowance to children under 3 and the grain producer's bread ration has been restored to its former level. The bread ration is now regularly available but full and punctual distribution of meat and fats rations is not everywhere maintained. In Paris only three-quarters of the official meat ration has been distributed in recent weeks, while larger towns in the South of France have not been receiving the scheduled quantities of milk. German demands for French agricultural produce in the current year are again high. These exactions are a very heavy burden for France and in excess of the quantities necessary for the maintenance of the occupying forces. If they were made available to the non-agricultural population they would make possible a very substantial improvement in French rations.

Belgium.—Following the 1943 harvest there have been two increases in the Belgian bread ration, and the weekly allowance for a normal consumer is now approximately 74 oz. as compared with 55 oz. in April last. The weekly fats and cheese rations were each increased by ½ oz. in September though there was a reduction of ½ oz. in the meat ration. These rations are regularly available and children continue to receive their priority allowance of whole milk.

Greece.—The system of food distribution here is different from that in other occupied countries. There appears to be no rationing of domestic produce. The relief commission distributes a regular bread ration in the principal towns and corresponding supplies of flour in many country areas. In addition it makes distributions of pulses, supplementary flour, sugar and sometimes olive oil and dried fruits, especially in the area of the capital. The commission also distributes supplementary allowances of bread and other goods, including milk to children and to certain specially necessitous categories. Conditions in the smaller towns vary considerably, according to local supplies, which frequently depend upon the extent of military activity in the neighbourhood. Generally speaking, supplies of cereals in the Greek islands are seriously inadequate, but the commission is endeavouring to extend relief to islands which it has not previously been able to reach. Replying to a further question Mr. Foot added that it had been decided that shipments to Greece shall be increased by the allocation of approximately 900 tons a month of fish products, and it is expected that supplies will soon be available to bring the total figure of fish and other special protein foods to 1600 tons a month, this being the amount requested by the Neutral Commission.

QUESTION TIME

University Grants Committee

Mr. T. E. HARVEY asked the Chancellor of the Exchequer the terms of reference of the recently reconstituted University Grants Committee; and whether its functions had been or would be enlarged, in view of the educational and financial problems confronting the universities.—Sir JOHN ANDERSON replied: No change has been made in the terms of reference of the committee, which are—

> To enquire into the financial needs of University education in the United Kingdom and to advise the Government as to the application of any grants that may be made by Parliament towards meeting them.

It seems to me that these terms of reference are wide enough to enable the committee to report on any problem on which the Government might need advice in connexion with the making of grants to universities.

Social Security

Replying to a question the PRIME MINISTER said he hoped that the white-paper on social security would be ready about the end of February or early March; but he could not pledge himself to any particular date.

Health Statistics

Major S. F. MARKHAM asked the Minister of Health whether he was aware that no detailed health statistics had been published for several years; and whether he would give authority for the issue of up-to-date civil and medical tables or statistical reviews to supplement the summary reports of the Ministry.—Mr. H. WILLINK replied: The medical section (Part I) of the Registrar-General's Statistical Review for 1940 was published in September last, and the civil section (Part II) of the 1939 Review in January last. Corresponding volumes for subsequent years are being issued as soon as possible; but their production is conditioned by restricted printing facilities. I regret that during the present extreme shortage of paper the volumes cannot be placed on public sale, but the statistics may be consulted at the office of the Registrar-General, from whom a temporary loan of any volumes desired can be had by those having occasion to refer to them.

Domestic Labour for Hospitals

Replying to Mrs. CAZALET KEIR, Mr. ERNEST BEVIN said that he had found it necessary to give first priority to domestic work in connexion with the care of the sick and wounded, the old and infirm and young children. He attached the highest importance to domestic work, which is essential to the efficiency of these services, and he was instructing his local offices to pay special attention to the filling of vacancies in this work. An advisory committee had now been formed, under the chairmanship of Mr. M. S. McCorquodale, the joint parliamentary secretary, and had already held its first meeting. Its members include: Captain H. Brierley, house governor and secretary of the London Hospital; Dr. Frederick Hall, MOH for Lancs; Mrs. Montagu Norman, chairman of the women's advisory council to the Nuffield Provincial Hospital Trust; and Miss O. M. Snowden, SRN, matron-in-chief of the Birmingham municipal hospitals.

Scottish Mental Hospitals

Major E. G. R. LLOYD asked the Secretary of State for Scotland whether he was aware that the status and admini-

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stration of the Royal mental hospitals was not considered by the Hetherington Committee although these hospitals were an integral part of the health services in Scotland; and if he had any statement to make on the matter.—Mr. T. JOHNSTON replied: In refraining from making recommendations based on the evidence which they received on the subject of the Royal mental hospitals, the committee had in mind that the mental hospital service rests on a special code of law which is at present being reviewed by the Russell Committee on the Lunacy and Mental Deficiency Laws of Scotland. The position of the Royal mental hospitals in relation to the proposed new health service is not being overlooked.

School Meals and Milk

In answer to questions on the supply of meals and milk to school children, the following figures for October, 1943, were given:

England and Wales	Number and percentage of—.	
	Children fed daily	Children receiving milk
Elementary schools ..	1,076,651 (26·5%)	3,100,271 (76·4%)
Secondary schools * ..	266,669 (52·2%)	323,550 (61·4%)
Total	1,343,320 (29·4%)	3,423,821 (74·7%)
Scotland	159,364 (21·2%)	513,502 (67·6%)

* These figures are approximate.

Emergency Pathological Laboratories

Mr. E. P. SMITH asked the Minister of Health whether his attention had been drawn to the action of directors of emergency public health laboratories in soliciting chemical and bacteriological practice in competition with public analysts, consulting chemists and bacteriologists; and since such action was contrary to the intention expressed in the circular letter issued by the Minister on Sept. 5, 1939, that the scheme should not interfere in any way with the operation of normal services, if he would take steps to put a stop to this practice.—Mr. H. WILLINK replied: I have received representations to this effect and my predecessor issued last year instructions calling attention to the purpose of the emergency public health laboratories. I am at present making inquiry into cases, brought to my notice by representatives of public analysts, in which they consider that work has been improperly diverted from public analysts.

Disinfection of Cinemas

Sir ERNEST GRAHAM LITTLE asked the Minister whether, in view of the current serious prevalence of airborne infections, which included influenza, he would give instructions for a short daily closing of cinemas between performances so as to allow of the ventilation and disinfection of the audience hall between sessions.—Mr. WILLINK replied: I am advised that adequate continuous ventilation is more effective than ventilation between sessions as a practical method of reducing the spread of infection. Inadequate disinfection would do more harm than good, and it is doubtful whether disinfection by aerosols to an extent that would provide an additional safeguard would be practicable for large places of entertainment at the present time. I understand that London County Council regulations and rules for the management of places of entertainment together require that adequate means of ventilation be provided in cinemas and adequate ventilation maintained while the public are on the premises.

Supply of Penicillin

Commander O. S. LOCKER-LAMPSON asked the Minister of Supply whether he would take steps to ensure that penicillin when used would be available for poor patients and not only for the well-to-do.—Mr. CHARLES PEAT replied: Before any penicillin is allotted for civilian use, which cannot be for some time yet, the Minister will consult the Minister of Health with a view to securing that it is made available for those purposes which should have priority on medical grounds.—Commander LOCKER-LAMPSON: May I ask to whom penicillin belongs and whether so valuable and vital a product ought not to be the property of the nation?—Mr. PEAT: I should like to have notice of that question.

Pensions Appeal Tribunals

Sir D. SOMERVELL, Attorney-General, informed Mr. GRAHAM WHITE and Mr. G. MANDER that pensions appeal tribunals had been sitting continuously since Oct. 18. There were four tribunals now sitting in England and Wales, in London and at various large centres in the provinces. In view of the large number of cases being made ready for hearing, an increase in the number of tribunals, both in London and in the provinces, would shortly be necessary, and arrangements to this end had already been made. From Oct. 18 to Jan. 14, the tribunals for England and Wales heard 746 appeals, of which 195 succeeded. The present average number of cases being disposed of daily is 26.

Sir E. GRAHAM-LITTLE asked the Attorney-General whether, in constituting pension boards after the war, preference would be given to medical officers who had served in the present war, as such officers would be in a better position to assess loss of fitness occasioned by war disabilities than medical men who had had no personal experience, and to allow these officers, who had lost their private practices because of that service, some measure of compensation for their financial loss.—Sir WALTER WOMERSLEY, Ministry of Pensions, replied: I am in general agreement with the suggestion that in constituting pensions boards after the war every opportunity should be taken to employ medical officers who have served in the Armed Forces.

Doctors and Hardship Appeals

Lieutenant H. W. BUTCHER asked the Minister of Labour if he would, with a view to conserving the time of doctors, arrange for appeals on hardship grounds to be determined before medical examination and not after.—Mr. ERNEST BEVIN replied: This procedure may be adopted in special circumstances with my permission, but it could not be made compulsory without legislation. I do not think it would be generally satisfactory, because it would mean putting the applicants concerned to a good deal of trouble for what might prove to be no purpose. Accordingly, although I should wish to economise the time of doctors in any way possible, I regret that I cannot adopt the suggestion in the question.

RAMC Awards

Replying to a question the Secretary of State for War said that since the outbreak of war 204 awards and decorations other than for cases of conspicuous gallantry have been made to RAMC officers. In addition, 449 officers have been mentioned in despatches.

Use of Artificial Legs

Replying to a question Sir W. WOMERSLEY said: Tuition in the use of artificial limbs and their attachments is given by the limb-makers in the early fitting stages and subsequently by the limb surgeons. Up to the present time the need has not arisen for the employment of wholetime instructors, but I am proposing to appoint such persons at the three artificial arm centres.

Quinine Stocks in Bengal

Large quantities of quinine have throughout been available to the government of Bengal, but until the middle of November the arrangements for its distribution inside the province were unsatisfactory. These have now been improved. Distribution in the famine areas is mainly free through hospitals, doctors and the military relief organisation, &c. Sale to the public is controlled, at the rate of Rs.37 per lb., but local shortages have driven trade stocks underground and black market prices are much higher. (Mr. L. S. AMERY replying to Sir S. SOUTHBY.)

A GLOSSARY OF COMMUNICABLE DISEASES.—The Health Organisation of the League of Nations announces that it will issue in a forthcoming issue of its *Bulletin* a comprehensive glossary of the names of communicable diseases in 24 languages. The index will contain some 5000 terms.

MILITARY HOSPITAL LENT TO AMERICAN ARMY.—On Jan. 15 a famous British military hospital was handed over to the medical services of the United States Army for the duration of the war. The *Times* reports that after a ceremonial parade, the registrar of the hospital, who has 51 years' army service and is the oldest serving soldier in the RAMC, handed a presentation key to Lieut.-General Sir Alexander Hood, director-general AMS, who presented it to Brigadier-General Paul R. Hawley, chief surgeon of the US Army in the European Theatre of Operations. General Hawley, in accepting charge of the hospital, said: "The RAMC has offered us its choicest possession. We shall cherish it and return it to you unharmed."

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Obituary

MAITLAND RADFORD

MD LOND, DPH

Dr. Maitland Radford, who died on Jan. 19, became medical officer of health for Shoreditch in 1928; and succeeded Dr. George Sowden at St. Pancras in 1934. His death, at the age of 59, takes from the public health service one of its most valued members; one whose personal qualities endeared him to all who had dealings with him, and whose breadth of vision and practical ability would have been invaluable in the times of change which are approaching. Those who worked with him will have a memory of one whose attitude towards others found expression in kindness and reasonableness (with a seasoning of humour) in all his doings. Human welfare in all its aspects was of interest to him, and it was natural that his colleagues should look to him for advice and guidance: and they never looked in vain. During the whole of his professional life he had the understanding support of his wife, Dr. Muriel Radford, whose work for child welfare in the metropolis, and especially at Chelsea, is well known.

During the troubled time of 1940–41 Maitland Radford was president of the metropolitan branch of the Society of Medical Officers of Health, and later he was elected chairman of the joint planning committee (metropolitan and home counties). To the work of planning he devoted much time and energy; his balanced outlook is revealed in "Thoughts on Medical Planning" (*Publ. Hlth, Lond.* Sept., 1941) when he said that "planners tend too much, and each from his own point of view, to see the future as the golden age when it will be finally agreed that there is nothing like leather." Later on in these thoughts he commends those concerned with social planning to reflect on the saying that nothing affords so good an index of the state of civilisation reached by any society as the position accorded to its women. He was never tired of insisting that the housewife should be "the central figure on whom we should concentrate our attention when we make plans for the future," and that the work of the welfare services, concerned with the introduction of new lives to the community, could never be overvalued. Housing too, as contributing to healthy and happy home life, and education in all its aspects, were also matters of concern to him. At the time of his death he was vice-chairman of the Central Council of Health Education; in a recent article of its journal he wrote: "the task before health education is not only immense but most urgent. Every endeavour should be made to call to its aid that spirit of democratic conviction and enthusiasm that is the mainspring of our present will to victory." This was his message. Although he was an official, he had in him much of the social reformer, including the reformer's impatience with bureaucratic methods.

THE LATE MR. WILLWAY

Supplementing the obituary notice of F. W. Willway in our last issue, Professor Geoffrey Jefferson writes: It is unlikely that any of us will again see such a combination of debonair heroism and sound practical utility as his life showed, not parallelled even by Hans Zinsser who had a shorter battle to fight and was an older man. Few people realise that death is close upon them and none that I have known have treated the knowledge with Willway's good-natured disdain. He expressed no bitterness at the shortness of his days, no complaints that he would never see the fruition of his plans and dreams. None the less he accomplished a great deal. He had a brilliant, a mobile, intelligence and a great disregard for the sanctity of the opinions of his elders from which all edge was removed by the knowledge that all that he had to say he said at once. And how entertaining he could be! We neuro-surgeons cannot afford these losses from our ranks that the last three months have brought. Willway and Eden were a notable pair and however time chances to fill the gaps those brave personalities are for ever lost.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export.

Notes and News

THE TURKISH MISSION

MEMBERS of a medical mission appointed by the Turkish Ministry of Health have arrived in Britain to study war medicine and surgery under the auspices of the British Council. They are Dr. Huseyin Avni Aksel, Lieut.-Colonel Burhanettin Tugan and Dr. Bekir Nimetullah Taskiran. Dr. Aksel has worked in both Berlin and Instanbul, where he is now chief surgeon at the Haseki Hospital. He has visited many European medical centres and takes special interest in lung surgery. Lieut.-Colonel Tugan is professor of clinical chemistry at the Gülhane Military Medical School, and a member of the Turkish Medical Council. He has visited medical centres in this and other European countries. In 1939 he represented Turkey at the tenth international congress of military medicine at Washington, and was appointed an honorary member of the American Association of Military Surgeons. Dr. Taskiran has just been appointed chief surgeon at the Ankara Model Hospital. He has studied in Istanbul, Berlin and Vienna.

FOUR X-RAY MARTYRS

ON Jan. 24 Dr. J. H. Sequeira unveiled in the X-ray department of the London Hospital a tablet to the memory of four co-workers who had sacrificed their health to advance our knowledge of X-ray treatment. The names of these pioneer radiographers are Ernest Harnack, Ernest Wilson, Reginald Blackhall and Harold Suggars.

University of Cambridge

On Jan. 21 the following degrees were conferred by proxy:

MB, B Chir.—Derek Ainslie, Fred Ashton, V. L. Billington, A. C. Carpenter, R. P. Cook, F. H. Epstein, W. G. Evans, A. M. N. Fisher, W. M. Foreman (in person) J. A. Hallinan, R. F. Hobson, R. G. F. Parker, T. J. Rendle-Short, L. A. Rook, L. J. Rowley, I. A. Roxburgh, F. A. R.-St. John, D. H. K. Soltau, P. G. Somerville, and R. G. Tasker.

Aftercare of Psychiatric Casualties

The Board of Control, in coöperation with the Service departments and the Ministries of Health, Pensions and Labour have initiated a scheme for the provision of aftercare for men and women invalided from the Services on account of psychiatric disabilities. The scheme aims at providing these patients with medical and social help during their readjustment to civilian life. The organisation of the work has been undertaken by the Provisional National Council in collaboration with the Mental After-Care Association. Officers commanding Service psychiatric hospitals and establishment and the medical superintendents of EMS neurosis centres will notify the Board of patients about to be discharged from the Services, returning to an address in England or Wales, who are in need of aftercare and are willing to receive it. The notification which will be accompanied by a report from a trained social worker allocated to each of the hospitals and centres by the PNC will be forwarded by the Board to the PNC to be dealt with by their regional psychiatric social workers. These officers will visit the patients at home and act in close coöperation with their family doctors and local authorities and government departments concerned. The work of the PNC is confined to England and Wales, and in Scotland the General Board of Control has undertaken the direct organisation of the social work. The Ministry of Home Affairs is considering introducing a similar scheme in Northern Ireland.

Standstill Order for Scottish Mental Nurses

The Secretary of State for Scotland under regulation 32AB has made an order prohibiting nurses employed in mental hospitals and institutions in Scotland from leaving their employment without the consent of the employing authority. The order, which brings Scotland into line with England and Wales, will apply in hospitals and institutions which adopt the Taylor Committee recommendations or have more favourable rates of pay and conditions of service for their nurses. Where lower rates are continued the advantages of the order in maintaining continuity of nursing staffs will not apply. Nurses with less than 12 months service and voluntary unpaid and part-time nurses are exempt. Normally permission will not be refused, if a nurse is leaving on promotion within the mental hospital service or for serious health or domestic reasons. A nurse who is refused permission can appeal to the chairman of the Board of Control. Employing authorities will be expected to secure the consent of the chairman of the Board of Control before dismissing nurses affected by the order.

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Food Education Society

Lord Horder will preside at the luncheon which the society is holding at the Connaught Rooms, Great Queen Street, London, W.C.1, on Monday, Jan. 31, at 1 PM, when the guest of honour is to be Lord Woolton.

Royal Institution of Great Britain

The Friday evening discourses, now held at 5 PM, to be given before Easter include: Prof. E. D. Adrian, OM, on brain rhythms (Feb. 4); Mr. E. Rock Carling on the medical and surgical achievement of Soviet Russia in war (Feb. 25); and Prof. D. M. S. Watson, D SC, FRS, on habit and evolution (March 10). The following lectures have also been arranged for Tuesdays at 5.15 PM: Prof. H. D. Kay, D SC, on modern developments in dairy science (Jan. 25, Feb. 1 and 8); Mr. J. Ramsbottom, D SC, fungi and modern affairs (Feb. 15, 22 and 29); Prof. A. R. Todd, D SC, FRS, the mode of action of some vitamins (March 7 and 14); Sir Henry Dale, PRS, chemical factors in nervous effects (March 21 and 28). On Thursdays, Feb. 24, March 2 and 9, at 2.30 PM, Sir J. C. Drummond, D SC, will speak on food fads and food fallacies.

Royal Society of Medicine

A meeting of fellows of the society will be held on Tuesday, Feb. 1, at 4.30 PM. On the same day, at 3 PM, the section of pathology is holding a laboratory meeting at the Lister Institute of Preventive Medicine, Chelsea Bridge Road, London, S.W.1. On Feb. 2, at 2.30 PM, Prof. J. A. Nixon will speak to the section of history of medicine on health and sickness in the Merchant Navy (to 1815) and Mr. Geoffrey H. Bourne, D SC, on records in the older literature of tissue changes in scurvy. At the section of surgery at 4.30 PM on the same day the following papers will be read: Mr. Douglas Freebody, some air-raid casualties; Surgeon Lieut.-Commander K. J. O'Connor, fatigue fracture; Mr. S. M. Cohen, amputation under ice anæsthesia; Mr. W. E. Springford, unilateral œdema of the leg; and Mr. T. R. M. Whigham, multiple primary carcinomata. On Feb. 3, at 2.30 PM, Dr. J. Purdon Martin will bpen a discussion at the section of neurology on venous thrombosis in the central nervous system. On Feb. 4, at 10.30 AM, at the section of otology, Major Gordon D. Hoople, USAMC, will speak on acute catarrhal otitis media and Prof. B. W. Windeyer on radiotherapy of malignant disease of the middle ear. Dr. T. B. Jobson will show a film of autoanæsthetic apparatus for ENT operations. The sections of laryngology and anæsthetics will meet the same day at 2.30 PM when Lieut.-Colonel Norton Canfield, USAMC, and Dr. M. D. Nosworthy will open a discussion on the rôle of the bronchoscopist in the prevention and treatment of traumatic and postoperative pulmonary lesions.

Medical Awards

As already announced, the DSO and George Medal have been awarded to Lieut.-Colonel R. M. Gordon, DFC, MB GLASG., RAMC, and the MC to Lieutenant C. G. Rob, FRCS, RAMC.

Colonel GORDON commanded a field ambulance throughout the Alamein battle and the operations culminating in the occupation of Tripoli. During the Alamein battle he was constantly in the forward areas visiting his regimental aid-posts and battalion headquarters, which were often under heavy shell-fire. It was largely due to his disregard of danger in supervising the collection and evacuation of casualties in his brigade that this was so efficiently carried out.

Last May on the Kairouan road, a ten-ton lorry overturned and burst into flames. Everybody in the vicinity stopped their vehicles and scattered, thinking that the lorry would explode, but Gordon without hesitation ran towards it, and although it was now blazing fiercely, plunged into the smoke and flames and shortly reappeared, dragging a man. A second time he ran in, and a second time he came out carrying a man. Both men were badly burned and helpless and would have been burned to death but for Gordon's presence of mind, fearlessness, and disregard for his own safety.

Lieutenant ROB, after a flight of some 350 miles and a parachute drop, performed some 140 surgical operations, often under enemy bombing and extremely bad conditions. After performing over 20 operations on one day, he gave a pint of his own blood to a patient when supplies of plasma and blood had run short. He was untiring in his work, and displayed a complete disregard for his own comfort and safety. These operations were performed at Beja, all equipment being dropped by parachute at Souk el Arba and carried by his section.

The DSO has been awarded to Lieut.-Colonel Ian Fraser, FRCS, RAMC, and to Lieut.-Colonel W. L. Brown, MD EDIN., RAMC, and the MC to Captain D. H. Ridler, LDS, Army Dental Corps.

Colonel FRASER was sent on the hospital carrier *St. David* to treat wounded from the beaches in Sicily. A few hours after the first landing on July 10 he volunteered to land at Cape Passero to search for and collect wounded. This he did in face of heavy and continuous dive-bombing and shell-fire. He operated in the ship's theatre continuously for the next 48 hours, in face of many enemy air attacks. Although exhausted, he gave a pint of his own blood to one of his patients. This officer, who was in charge of a team investigating penicillin (*Lancet*, 1943, ii, 742), not only set an inspiring example of coolness under fire but by employing a new technique for the first time in forward surgery has established a new and most valuable wound treatment. Colonel Fraser was again in action under fire on the Salerno beaches from Sept. 21 to Oct. 10.

On the night of July 13, 1943, Captain RIDLER was dropped by parachute near the Ponte Primsole, Sicily. He led his stick with heavy equipment on a trolley over 4 miles of difficult country. He entered the farm selected as a dressing-station with one combatant soldier who took prisoner 20 Italian soldiers who were occupying it. Ridley set his men and the prisoners to prepare the dressing-station, and went off to contact other units. For two days he worked in the dressing-station under fire, giving anæsthetics for two surgeons. It was by his initiative and gallantry that the dressing-station was set up, and by his devotion to duty that operations were able to be performed even when the dressing-station was over-run by the enemy.

Appointments

FRASER, PATRICK, MB EDIN.: examining factory surgeon for Whitburn, West Lothian.

ISON, LOUIS, MB DURH.: examining factory surgeon for Dalton-in-Furness, Lancs.

KITCHIN, I. D., MB ABERD., FRCSE: medical referee for the county-court districts of Chorley, Lancaster and Preston.

MACKAY, W.: examining factory surgeon for Kippen, Stirlingshire.

London County Council.—The following appointments have recently been announced:

BARLING, BENJAMIN, MD LOND., MRCP: senior physician, St. James' Hospital;

MURPHY, F. D., MB NUI, FRCS: deputy medical superintendent, (Class II) and senior resident surgeon, St. Mary Abbots Hospital;

SEARS, W. G., MD LOND., MRCP.: medical superintendent, St. Mary Abbots Hospital;

FELDMAN, W. D., MD LOND., MRCP: medical superintendent, Mile End Hospital;

PINHEY, E. T., MB SYDNEY: medical superintendent, St. Pancras Hospital;

TAYLOR, R. THANE, MRCS: medical superintendent, St. John's Hospital; and

EISER, ARTHUR, MD PRAGUE: deputy medical Superintendent (class IV temp), Colindale Hospital.

Births, Marriages and Deaths

BIRTHS

BROWNE.—On Jan. 18, the wife of Captain H. J. Browne, MC, RAMC of Barlaston, Staffs—a son.

BROWNRIGG.—Oh June 9, 1943, the wife of Squadron-Leader E. K. Brownrigg, RAFVR—a daughter.

DOWLER.—On Jan. 19, the wife of Dr. H. G. Dowler, of Churchdown, Glos.—a son.

HALL.—On Jan. 11, at Leeds, Dr. Jean Hall, the wife of Mr. R. A. Hall, FRCS—a son.

HARRIS.—On Jan. 15, at Chailey, Sussex, the wife of Dr. E. E. Harris—a son.

HYSLOP.—On Jan. 15, at Settle, the wife of Dr. W. Anthony Hyslop—a daughter.

MULLER.—On Jan. 22, in London, the wife of Surgeon Lieutenant C. F. Muller, RNVR—a son.

PRATT.—On Jan. 19, the wife of Dr. T. A. Pratt, of Guisborough—a daughter.

RYLE.—On Jan. 19, at Oxford, the wife of Surgeon Lieutenant John C. Ryle—a daughter.

MARRIAGES

DAVIS—MARTINDALE.—On Jan. 15, in London, Geoffrey Stanley Davis, surgeon lieutenant, RNVR, to Sheelagh Anita Martindale, VAD, RN.

SMITH—BRIAND.—On Jan. 18, at Leek, F. M. Smith, MRCS, to B. E. Briand, SRN.

WELBOURN—HAIGHTON.—On Jan. 21, at Nantwich, Richard Burkewood Welbourn, MB, captain RAMC, of Rainhill, to Rachel Mary Haighton, BDS.

WILKINSON—HARVEY.—On Jan. 15, in London, Anthony Thornton Wilkinson, lieutenant Parachute Regiment, to Marcia Isobel Pamela Harvey, BM.

WILLIAMS—PACKER.—On Jan. 14, at Aldershot, Michael Henry Currer Williams, surgeon lieutenant, RNVR, to Mona Mary Dixon Packer, WRNS.

DEATHS

CROSS.—On Jan. 16, at Bristol, Claude Harold Cross, MRCS, major, IMS (ret.).

FAIRBAIRN.—On Jan. 22, at Lossiemouth, John Shields Fairbairn, BM OXFD, FRCP, FRCS, FRCOG.

HARDYMAN.—On Jan. 9, George Hardyman, MB EDIN., FRCSE, of Bath, aged 81.

MARTIN.—On Jan. 19, Winifred Dickson Martin, MD, FRCSI, aged 77.

PATTERSON.—On Jan. 24, at Eltham, Frank Russell Patterson, MB EDIN, aged 77.

PORTER.—On Jan. 19, Thomas Morrison Porter, MRCS, of West Hampstead, aged 87.

PURNELL.—On Jan. 22, Purnell Purnell, MRCS, of Leigham Court Road, S.W.16.

RADFORD.—On Jan. 19 at Potters Bar, Middlesex, Maitland Radford, MD LOND., DPH, medical officer of health for St. Pancras, aged 59.

SEYMOUR-PRICE.—On Jan. 24, at Oxted, Surrey, Philip Seymour-Price, MRCS.

TOPLEY.—On Jan. 21, William Whiteman Carlton Topley, MD CAMB., M SC. MANC., FRCP, FRS, aged 58.

VAUGHAN-JACKSON.—On Jan. 17, at Potters Bar, Herbert Francis Vaughan-Jackson, MRCS, aged 84.

WOODWARK.—On Jan. 22, Charles Stuart Woodwark, MRCS, JP, of Grimston, Norfolk, aged 66.

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ERYTHROBLASTIC ANÆMIA OF CHILDHOOD (COOLEY'S ANÆMIA) IN CYPRUS

ALAN L. FAWDRY, M D CAMB
DISTRICT MEDICAL OFFICER, COLONIAL SERVICE, CYPRUS

COOLEY'S anæmia is by now a sufficiently well-defined entity to have found a place in the standard textbooks, and during the last decade enough cases have been reported to remove from it the glamour of rarity, at least in Mediterranean countries. That the condition had been observed in these regions before Cooley (1927) wrote his descriptions of 5 American children of Mediterranean origin can scarcely be doubted, and Arabantinos described a case of pseudoleishmaniasis as far back as 1911. However, most were probably considered as serious anæmias secondary to the malaria which abounds in these places; certainly this has been so until recently in Cyprus and nothing has been recorded of the diseases in the island hitherto except that Arabantinos (1936) mentioned that he had seen cases from Cyprus and 2 of the children described by Caffey (1937) were of Cypriot parents.

The characteristics of the disease described by Cooley were: a chronic and ultimately fatal anæmia of early onset in children of Mediterranean stock, with splenomegaly, peculiar bone changes most conspicuous in the skull, a familial incidence, the presence of large numbers of nucleated erythrocytes in the peripheral blood and a mongoloid facies which is due partly to changes in the bones of the face and partly to the pallor of the skin.

Since the time of the original description similar syndromes have been found, in which one or more of the above features may be absent.

Firstly, the disease is not necessarily fatal in childhood (Arabantinos 1936); secondly, it has been found in children who have never lived in nor had any known hereditary connexion with the Mediterranean countries—e.g., in an English girl (Bywaters 1936), in a Chinese (Foster 1940), and in a Hindu (Mukkerji 1938); thirdly, X-ray changes in the skull are very diverse and may be absent in young children; fourthly, skull changes may occur without mongoloid facies (Caminopetros 1938).

Caminopetros (1938) and Damashek (1940) have described cases in which the characteristic bone-changes were not accompanied by the presence of nucleated erythrocytes in the blood; the former emphasises the constant presence in such patients and in those with erythroblastic blood of an increased resistance of the erythrocytes to hæmolysis by hypotonic saline. The importance of this feature is paramount in proving the hereditary nature of the disease, as it is found in apparently healthy relatives of the patients, and is transmitted as a mendelian recessive from one generation to another along with bone-changes which may not be apparent except radiologically. Wintrobe et al. (1940) have described a hereditary set of hæmopoietic anomalies found in Americans of Italian origin which can be considered as a benign form of Cooley's anæmia; the erythrocytes of these adults and adolescents showed some or all of the features seen in children with Cooley's anæmia, including increased resistance to hæmolysis by hypotonic saline, but none of them presented on account of anæmia; in fact several showed a slight degree of erythrocytosis. Owing to the isolation of Cyprus in wartime, I did not at first know the work of these investigators, and no examinations of red-cell fragility were made until recently; but a few measurements in relatives of a child with this anæmia (not recorded in the accompanying tables) confirm this discovery of Caminopetros. I have also observed a boy of 9 with a chronic anæmia not reacting to iron, splenomegaly, enlarged lymph glands, a mongoloid face, excessively normoblastic bone-marrow, decreased red-cell fragility but no erythroblasts in the peripheral blood. His mother and brother showed decreased fragility of red cells.

In view of these possible deviations from the features of the disease described by, and named after, Cooley, and the incompleteness of the radiological examinations possible, it seems preferable to use the comprehensive term "erythroblastic anæmia of childhood," though there can be little doubt that this Cyprus anæmia could rightly be called Cooley's anæmia. That it is not rare in the island is evident from the fact that during 2½ years 20 cases, nearly all from the district of Famagusta (781 sq. miles out of the whole island of 3572 sq. miles), have been diagnosed, and several more seen in whom a merely cursory clinical examination made the diagnosis highly probable. There is no reason to suppose an uneven distribution and the incidence must therefore be high. Caminopetros described only 48 cases of all kinds of erythroblastic anæmia of children drawn from a considerable area of the Greek mainland and islands, over a period of 3 years.

Absence of laboratory facilities close at hand, the idiosyncrasies of the young patients and their parents, the complications of a war-time economy and the exigencies of more essential duties are responsible for many lacunæ in the diagnostic investigation of these cases, but I have set out the clinical and hæmatological findings because the commonness of the disease in Cyprus has so far not been recognised either within or outside the island.

The nomenclature of both diseases and of blood-cells throughout this paper is that of Vaughan (1936). The hæmoglobin readings were all made on the same Sahli instrument and converted from the readings recorded at the time to percentages based on the results of a checking of the instrument's readings against an estimation of the oxygen-carrying capacity of a blood-specimen, assuming that 14·5 g. Hb. per 100 c.cm. blood corresponds to 100% Hb.

CLINICAL AND LABORATORY FINDINGS

Details of 20 cases so far observed are given in tables I, II and III. In general the observations show that the disease picture in Cyprus corresponds closely to that found in other Mediterranean countries and in America. All the cases recorded are of Greek Cypriots, but since the tables were compiled a Turkish boy also with all the features of the disease has been seen. The points worthy of special note are:—

(*a*) The predominance in males.

(*b*) The febrile onset: the mothers of the children were usually quite definite about this, though no children were febrile when seen. Almost every child had had a long course of antimalarial treatment at some period of the illness and some had been treated for kala-azar too.

(*c*) A history of earth-eating was given occasionally and the mothers usually attributed the disease to this, though on further inquiry it was clear that the febrile attack preceded the earth-eating tendency. This is also recorded by Caminopetros (1938) who associates it with a special type of skull change without mongoloid facies (*anémie des geophages*); he points out, too, that Hippocrates noted the desire of anæmic children to eat earth.

(*d*) In spite of gross physical changes (fig. 1), no adverse effect on mental development was found—in fact some of the children seemed unusually intelligent and quietly self-contained. Restriction of normal childhood activity by weakness was perhaps responsible for this.

(*e*) The mongoloid features were fairly constant in the older children but differed greatly in degree, as can be seen from fig. 1 (especially cases 17 and 18).

(*f*) The radiological changes correspond fairly closely to those described in detail by Caffey and confirm that the radial striation of the calvarium (fig. 2), though most distinctive when seen, is by no means constant. A peculiarity of case 19 is the stippling of the surface of the cranial vault: this resembles on a much smaller scale the circular excavation noted in *anémie des geophages* by Caminopetros.

(*g*) The subjective severity of the disease is entirely a function of the degree of anæmia present, which is, as far as present observations go, remarkably constant over a long period of time. It curiously lacks correlation with the age of the child, the date of onset of the illness, the bone-changes, or the number of nucleated erythrocytes in the peripheral blood.

(*h*) The anæmia is always hypochromic (a mean corpuscular volume (MCV) of 68 cμ was found in case 11).

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(*i*) Leucocytosis is common in the younger children, but in the older is usually absent: on the whole the percentage of lymphocytes is increased, and occasionally the monocytes are increased.

(*j*) Of the nucleated erythrocytes seen in the peripheral blood the vast majority are normoblasts, but in most cases there is a small proportion of more primitive cells.

(*k*) Owing to staining difficulties, thick films were not examined for plasmodia in every case, but scrutiny of the thin films and marrow-smears has failed to give any positive evidence of malarial infection, and no febrile attacks were recorded in any of the children who stayed in hospital (7 out of the 20) nor was any history of recent attack obtained from the parents. Most of the children (15 out of 20) came from villages situated on the central plain of the island where malaria is least prevalent, and though the possibility of coincident malarial infection cannot be absolutely excluded, that it plays any important part in the ætiology of this anæmia seems extremely unlikely.

(*l*) The films of bone-marrow (taken with a Salah needle from the sternum of all but the youngest children, in whom the tibia was used) show an enormous preponderence of normoblasts; no cells meriting the name of "megaloblasts of Ehrlich" were seen. The cells recorded as "hæmocytoblasts" are large (2–3 times the diameter of a normal red cell) and rounded, with deeply basophil, non-granular cytoplasm: the round nucleus occupies three-quarters at least of the area of the cell, is finely reticulate and purple-stained, with 3–5 bluish nucleoli. The normal marrow-blood in children, according to Kato (1937), does show a smaller proportion of myeloid elements than that in adults, but these nevertheless preponderate over the cells of the red series. In the present cases the latter outnumber all the white cells on the average by about 6 to 1.

(*m*) Though measurements of erythrocyte fragility were not made, target-cells, which Barrett (1938) found were abnormally resistant to hypotonic saline, were present in 50% of the cases. These are found in various diseases: their association with erythroblastic anæmia is mentioned by Damashek (1940) and though not noted by Caminopetros (1938) in his text, are visible in the illustration of peripheral blood film in his paper.

DIFFERENTIAL DIAGNOSIS

Von Jaksch's anæmia.—As there is no clear definition of this anæmia, and it is usually regarded as a syndrome secondary to various conditions such as rickets, tuberculosis, gastro-intestinal disturbance or syphilis, it can be excluded by the elimination of such primary diseases; no signs of them were found in the cases under consideration.

Familial hæmolytic icterus.—Since in this disease nucleated erythrocytes appear in the blood, and bone-changes like those of Cooley's anæmia may be present, it is almost impossible to exclude it from the present series without measurements of erythrocyte fragility; but the childhood incidence, the chronic and severe nature of the anæmia, the absence of icterus, the lack of febrile crises, the lowness of the colour-index in most cases and the degree of poikilocytosis make hæmolytic icterus unlikely.

Iron-deficiency anæmia.—Though children are often breast-fed for over a year in Cyprus, nutritional iron-deficiency does not seem to be common and the children in the present series clearly show many features not found in iron-deficiency, in particular the large number of circulating nucleated erythrocytes, the enlargement of liver, spleen and lymph glands, the bone-changes and the excessively normoblastic bone-marrow. None of those who were given iron by mouth showed the slightest sign of improvement.

Anæmia secondary to malaria.—As pointed out above, malaria is here unlikely to be implicated, but the differential diagnosis may be difficult if a child has suffered from severe malaria for a long time; and in fact Nittis and Spiliopoulos (1937) regarded Cooley's anæmia as being caused by chronic malaria and curable by antimalarial therapy. Their conclusions are not supported by the many cases of the disease in which malarial infection has been almost out of the question, and other observers have reported failure to discover plasmodia in the blood. Caminopetros not only denies the malarial origin of the disease but thinks that malarial infection has a beneficial effect on its course.

Infantile kala-azar.—Though the superficial resemblance is great, the leucopenia, positive formol-gel reaction and finding of the parasite in spleen or marrow blood serve to distinguish this disease fairly easily.

The bone-changes in *Albers-Schonberg's disease* are distinctive and examination of the bone-marrow eliminates such rarities as *Gaucher's disease* and *aleukæmic leukæmia*.

TABLE I—CLINICAL SUMMARY IN 20 CASES

Case no.—	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Age in years	½	1	1	1½	2	2¾	3½	4½	6	6	6	6	7	8	8	8	8	11	12	20
Sex	F	M	F	M	M	M	M	M	M	F	M	F	M	M	M	M	F	M	M	M
Brothers or sisters affected	0	..	0	0	1	0	0	1	0	1	0	0	0	..	0	0	0	..	1	0
Other relatives affected	0	..	..	..	..	..	..	0	0	1	0	1	..	..	..	..	1	..	..	1
Age at onset (year)	½	½	?0	¾	½	½	¾	3	2	1	2	3	2/52	..	2	..	3	1	5	1½
Fever at onset	+	+	+	0	+	+	+	+	+	..	+	+	+	+	0	..	+	..	+	+
Earth-eating	..	..	..	+	..	+	+	..	0	..	+	0	..	..	..	..	0	..	0	..
Age at death	..	..	..	..	2	..	4½	..	..	..	..	6	8	..	..	..	..	..	..	..
Stunted growth	0	0	+	0	+	0	0	0	0	0	0	+	+	+	+	0	0	+	0	+
Wasting	+	+	+	..	+	+	0	0	0	0	0	0	0	+	+	0	+	0	0	0
Mental retardation	..	..	..	..	..	..	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Œdema	0	0	0	0	0	0	0	0	0	0	0	+	0	+	0	0	+	0	0	0
Cardiac enlargement	0	0	0	+	0	++	++	0	+	++	++	++	++	+	+++	0	+++	+	++	+
Systolic murmur at apex	..	..	..	..	+	+	+	+	+	+	+	+	+	..	+	..	+	+	+	+
Glands enlarged	0	0	0	0	+	+	+	0	0	0	+	+	+	..	0	+	0	+	+	+
Liver enlarged (finger-breadths)	+	+	+	3	2	5	5	0	0	2	3	3	3	+	2	3	5	3	1	10
Spleen enlarged (Hackett)	1	1	1	2	3	2	2	1	1	1	1	4	2	+	4	1	3	2	1	4
Mongoloid facies	0	0	0	0	0	0	0	0	++	0	++	++	+	+	+	++	++	+	+	++
Palpable cranial changes	0	+	0	+	+	+	0	0	+	0	++	+	+	+	++	++	++	0	+	++
X-ray examination—																				
Cranial thickening	..	..	..	0	..	..	0	..	+	..	+	+	++	+	++	++	..	..	++	+++
Cranial striation	..	..	..	0	..	..	0	..	0	..	+	0	++	+	0	+	..	..	0	+

In all cases tested Wassermann and formol-gel reactions were negative.
No plasmodia or Leishmann-Donovan bodies were found.

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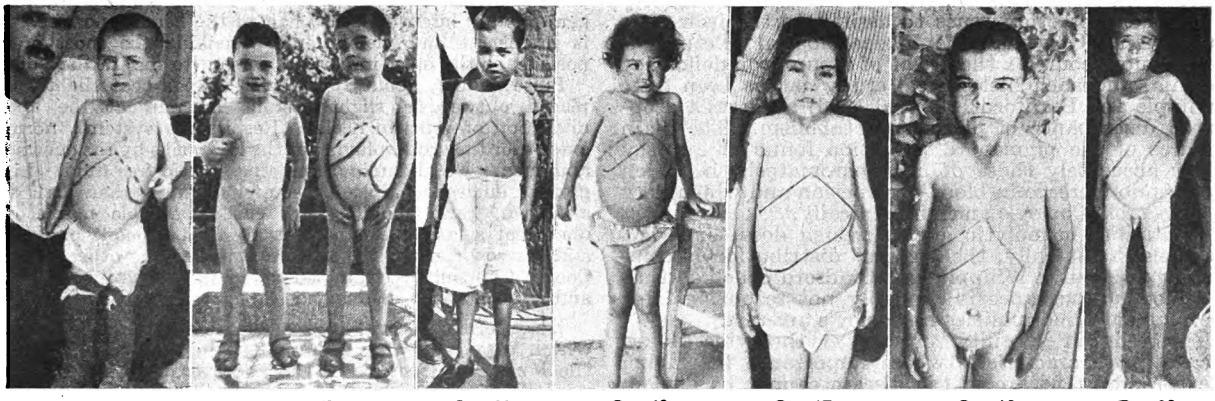


Case 6 Case 7 Case 11 Case 12 Case 17 Case 18 Case 20

Fig. 1—Physical changes associated with the anæmia, including enlarged spleen and liver, and in some mongoloid facies and epicanthus. Case 20 shows dwarfing, infantilism and exophthalmos.

TREATMENT

To cases 6, 7, 13, 15, blood-transfusions were given but without permanent improvement. To case 19 a transfusion was given when he had 25% hæmoglobin; after this he was lost sight of for 9 months, when he reappeared looking much fitter and with hæmoglobin of 55%. The boy's mother stated that this improvement did not immediately follow the transfusion but had begun more recently. Since his illness had begun comparatively late in childhood (at 5) it may have been a milder form, as recorded by others (Baty et al. 1932). By means of two transfusions, one from his father and one from his mother, the hæmoglobin value of case 7 was raised to 45% but sank again to 25% after 2 months. The temporary improvement in the child's condition was striking.

Most of the children were given iron by mouth (ferri et ammon. cit. 1 gramme t.d.s.) for some weeks but no improvement was noticed at all. To case 7 ferrous sulphate (3 grains t.d.s.) was given for 2 weeks and reticulocyte counts were done repeatedly; there was no rise in reticulocytes beyond 2·5%, and the hæmoglobin value at the beginning and end of the period was 25%. To case 11, 2 c.cm. 'Campolon' were given for 10 days without rise in hæmoglobin or reticulocyte response: there was however an increase in the number of circulating nucleated red cells from 1200 to 5500 per c.mm. The lack of response to these usual therapeutic measures is in accordance with the experiences of most other observers.

ÆTIOLOGY

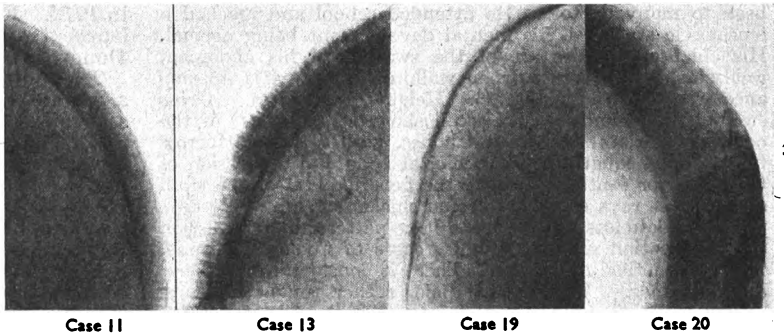
Until more work has been done on the biochemistry and pathology of this anæmia, speculation about the fundamental abnormality of function is intriguing but somewhat futile. Although some intrinsic defect in the hæmopoietic tissues has been favoured by most, the possible responsibility of an infective organism, or the deficient absorption of some hæmopoietic substance cannot be ruled out. It is curious that a sudden breakdown of orthodox hæmopoiesis should occur with concomitant fever at an interval (very variable) after birth: likewise that the defect, if intrinsic, should reduce the marrow to a state wherein it cannot supply the normal needs of the child but manages nevertheless to maintain equilibrium with blood-destruction, often for many years. The peculiar distribution round the Mediterranean is compatible with an infective cause (cf. infantile kala-azar), as is the familial incidence, but the subsequent discovery of isolated and unconnected cases elsewhere is against it. Arabantinos (1936) supported the idea of an "infective or parasitic process" with "affinity for the hæmopoietic system."

The interval between birth and the onset of the illness seems to make it unlikely that there is much in common between this anæmia and erythroblastosis fœtalis, which, according to Levine et al. (1941) and Boorman et al. (1942) is due usually to iso-immunisation of an Rh-negative mother to the Rh-antigen contained in her Rh-positive fœtus. But study of the incidence of the Rh-antigen in families affected with Cooley's anæmia is clearly called for, as is observation from birth onwards of children born into such families in the hope of gaining more information about the mode of onset of the disease.

That an essential hæmopoietic factor fails to be absorbed from the gut is suggested by the occasional association of erythroblastic blood with bone-changes in idiopathic steatorrhœa (Bennett, Hunter and Vaughan 1932). However, this erythroblastic anæmia responded fairly well to iron, a reduction in nucleated cells accompanying the improvement, and the bone-changes resemble histologically those of osteomalacia, which those of Cooley's anæmia do not (Whipple and Bradford 1932, Turnbull 1936). Besides this these children do not appear to suffer from any constant gastro-intestinal disturbances nor show any other lesions traceable to dietary deficiency, being on the whole fairly well nourished.

Whipple and Bradford (1932, 1936), Baty et al. (1932) and Turnbull (1936) have found bone-marrow changes closely resembling those in pernicious anæmia but in none of the present cases was this found. In fact the films from the bone-marrow showed a greater resemblance to those of iron-deficiency anæmias, though the proportion of normoblasts is much higher. For instance, in a series of 23 sternal-puncture findings in such anæmias Scott (1939) records 0·35 as the lowest leuco-erythrogenetic ratio (i.e., the ratio between the percentage of nucleated erythrocytes and that of the immature cells of the granulocyte series from myeloblast to young neutrophil inclusive), whereas of the present 16 sternal-marrow examinations the highest ratio (case 6) is 0·23.

Examination of gastric contents was not carried out but other observers have recorded achlorhydria, hypochlorhydria and normal findings. This too makes any close relationship to pernicious anæmia seem unlikely. As the anæmia is definitely not cured by iron administered orally and as there is no reason to suppose deficient



Case 11 Case 13 Case 19 Case 20

Fig. 2—Radiograms of calvaria showing radial striation.

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absorption, it may be that the defect lies in inability of the hæmopoietic tissues to assimilate the iron after absorption. However the hæmatological picture is clearly more complex than that of a pure iron-deficiency anæmia, and such histological study as has been done (Whipple and Bradford 1932 and 1936) suggests a deep-seated disturbance of pigment metabolism. The main features of the pigment distribution found at autopsy follow accurately those of hæmochromatosis, in which there is no increase in blood-destruction and which does not resemble Cooley's anæmia clinically.

In familial hæmolytic icterus, which does somewhat resemble it clinically, the pigment distribution is completely different. Whipple and Bradford conclude that the blood disturbance is probably not responsible for the pigment abnormalities in Cooley's anæmia.

The reduced fragility of the erythrocytes is an interesting characteristic whose importance in tracing the hereditary nature of the disease cannot be denied, but it throws little light on its pathology and is not peculiar to anæmias, since it occurs, for instance, after splenectomy (Barrett 1938). The possible connexion of this fragility with the enormous increase in the number of circulating nucleated red cells produced by splenectomy in Cooley's anæmia (Baty et al. 1932) may be mentioned; splenectomy in hæmolytic jaundice is symptomatically curative, whereas in Cooley's anæmia it is not merely useless but aggravates this important blood change.

If the blood changes are inexplicable in the present state of knowledge, the bone-changes must needs be even more so. Three factors appear to link the two processes: (*a*) the mechanical disturbance of the bone architecture by the hyperplastic marrow, Cooley's original suggestion; (*b*) the development of bone over a long period in surroundings where the supply of minerals and vitamins is probably adequate but that of oxygen deficient; (*c*) the close physicochemical interrelationship of ionic calcium and ionic iron (cf. their competition for phosphate ions in the intestinal tract).

The cardiac enlargement and the symptoms common to all severe anæmias remain about the only features which we can attribute directly to the long-standing deficiency of circulating hæmoglobin.

It is tempting to think, too, that the infantilism seen when the child survives puberty is a consequence of damage to the endocrine glands by the anæmia, as did Arabantinos (1937), but it is possible that this, too, is part of a primary disturbance of bodily function. The anæmia does not appear to affect the development of the brain, so why should it affect that of pituitary or testes? It is as possible that the dysfunction of blood and bone has an endocrine origin.

COOLEY'S ANÆMIA IN AN ADULT

Cases of Cooley's anæmia surviving to adult age are rare; the one recorded here resembles closely one of 3 seen by Arabantinos (1936). Dameshek says that 8 cases had been reported up to 1940 in people over the age of 14 but omits Arabantinos's paper from his references.

CASE 20.—A man of 20. According to his father, he was the 4th child, the other 3 being alive and well. His uncle was reported to have suffered from a similar disease but recovered; no similar illness known in family otherwise. Breast fed; well till 1½ years old, when he suffered from fever and later his abdomen swelled and he became pale. He had been to many doctors. He attended school and reached a reasonable standard, his mental development being normal. His chief complaints are of the swelling of his abdomen, weakness, and dyspnœa when walking uphill. His appearance was astonishing (fig. 1). Height 4 ft. 8¾ in. Gross swelling of abdomen. The skull showed "bossing" of the occipital, parietal and frontal bones, with a sagittal furrow between the squami of the occipital bone and depression of the posterior fontanelle below the general level of the skull surface. X rays showed extreme thickening, up to 2½ cm., with complete loss of the normal bone pattern, but suggestion of the striation seen in younger cases of Cooley's anæmia. The conjunctivæ are icteric. There is considerable bilateral exophthalmos. The skin is pale, rather rough, dry and pimply. The tongue and nails are normal. The teeth are well-formed but show enamel hypoplasia. There is a uniform moderately hard enlargement of the lymph glands. His voice is prepuberal; there is no pubic or axillary hair; the genitalia are infantile. The hair of the head is normal. He is intelligent and visibly enjoys making the most of his position as the most important person (to me) in the village.

Pulse regular, about 100 at rest. Apex-beat slightly displaced outwards: slight systolic murmur at the apex: dilatation of veins in neck. Respiratory system; normal, except for the gross splaying of the lower ribs by the enormous abdomen. No abdominal tenderness. No free fluid. Liver grossly enlarged. Spleen occupying more than half the abdomen, hard, mobile, with easily palpable notch. No abnormal signs in the nervous system. Blood, peripheral and marrow: much the same features as the other cases of Cooley's anæmia. Examined again in August, 1942: Hb. and red-cell count unchanged (tables II and III).

He differs from Arabantinos's case in the exophthalmos, which may safely be assumed to be due to changes in the bony architecture of the skull, since it is unaccompanied by any evidence of thyrotoxicosis. Arabantinos's case showed the common mongoloid feature of a long epicanthic fold, and this was associated with prognathism. The dissimilar facial appearance in my case is perhaps due to the much earlier onset of the disease (at 1½ instead of 10). No changes were visible in the optic disc, and ocular movements were unaffected.

In the absence of the leucocytosis often seen in young children with Cooley's anæmia, and in the preponderance of lymphocytes in the differential count the case resembles that of Arabantinos; but it differs in the presence of early and late primary erythroblasts besides normoblasts in the peripheral blood.

Other Anæmias Seen in Cyprus

In the absence of accurate statistics opinions as to the relative incidence of different diseases in a community are bound to suffer from the vagaries of subjective impressions, but the picture presented in Cyprus to one interested in hæmatology is so strikingly different from that seen in England or in tropical countries that the following mere impressions seem worth recording. They have been acquired during 4 years in government service, chiefly in the Paphos and Famagusta districts, which together cover about a third of the island, whose population is about 385,800 and area 3572 sq. miles. Most of the inhabitants are Greek-speaking and belong to the Greek Orthodox Church but a fifth are Turkish-speaking Moslems.

Iron-deficiency anæmias.—In infancy and childhood, rare; in adults (idiopathic hypochromic), not seen; in pregnancy, rare.

Anæmias due to deficiency of PA factor.—Nutritional (tropical megalocytic), fairly common; Addisonian, rare; other forms, not seen.

Other dyshæmopoietic anæmias.—Cooley's erythroblastic, fairly common.

Post hæmorrhagic.—Especially following miscarriage, childbirth and stab-wounds, common.

Anæmia secondary to other diseases.—Chronic sepsis, common; malaria, common; kala-azar, rare.

Ankylostomiasis is unknown in the island, as also, in spite of the prevalence of malignant malaria, are authenticated cases of blackwater fever. A few cases of infantile kala-azar have been reported chiefly from the north near Kyrenia. A case was described by Astreos in the Annual Medical Report of the Colony (1935) and I had the opportunity of examining another in 1942. Erythrocytes 1,350,000 per c.mm.; Hb. 15%; leucocytes 1600 per c.mm.; abundant Leishmann-Donovan bodies in the sternal marrow.

The only form of anæmia which might constitute a public health problem of any magnitude is that secondary to malaria. In a rough survey made in August, 1942, of two highly malarious villages adjoining a large marsh at the western end of the island the mean hæmoglobin of 101 out of 600 inhabitants was found to be 65% with a standard deviation of 12·5%. Their parasite rate was 60%. No investigations have yet been made on non-malarious communities, however, so it is impossible to ascribe the low hæmoglobin level definitely to chronic malaria. Over most of the island effective control of anopheline breeding has been carried out for the last 3 years, so that anæmia secondary to malaria is in general disappearing.

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TABLE II—PERIPHERAL BLOOD PICTURE

Case no.—	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Red cells—																				
Hb. %*	25	35	25	40	12	30	25	40	35	35	40	15	12	12	12	55	25	15	25	25
Cells (millions/c.mm.)	1·4	3·0	2·8	3·9	1·9	2·8	1·6	3·5	3·3	2·1	3·0	1·2	1·75	1·8	1·6	3·9	1·7	1·6	2·2	2·8
Colour-index	0·9	0·6	0·4	0·5	0·3	0·5	0·8	0·6	0·5	0·8	0·7	0·6	0·3	0·3	0·4	0·7	0·7	0·5	0·6	0·4
Anisocytosis	+	+	+ +	+	+ +	+ +	+	+	+	+	+	+	+ +	+ +	+ +	+	+ +	+	+	+ +
Poikilocytosis	+	+	+ +	+	+	+ +	+	+	+	+	+	+	+ +	+ +	+ +	+	+ +	+	+	+ +
Anisochromia	0	+	+ +	+	+	+	+	+	+	+	+ +	+	+ +	+	+	0	+	+	+	+
Polychromasia	+	+	+ +	+	+	+	+	0	+	+	+	+	0	+	+	+	+	+	0	+
Punctate basophilia	+	+	+	+	0	+	0	0	0	0	+	0	0	0	0	+	0	+	0	0
Target cells	0	+	+	+	0	0	0	+ +		0	+ +	0	+	+ +	0	0	0	0	+ +	+
Nucleated cells (1000/c.mm.)	0·34	13·0	29·0	16·5	2·0	2·0	1·2	0·7	2·5	0·9	1·2	0·6	3·6	77·0	1·4	1·2	0·5	0·17	0·18	1·2
Late erythroblasts per 200 white cells	1	4	10	18	10	6	0	2	11	3	1	3	7	8	9	0	2	0	0	10
Early erythroblasts per 200 white cells	2	2	0	10	12	2	0	0	5	1	2	3	1	0	3	2	3	0	0	4
White cells—																				
Total, 1000/c.mm.	8·0	27·0	21·0	17·5	13·0	17·0	6·2	9·0	10·0	6·0	9·0	10·0	12·1	23·0	4·2	9·0	10·0	5·0	7·0	6·3
Polymorphonuclears %	56	22	36	39	30	58	54	35	49	57	61	41	57	42	61	51	42	44	35	37
Lymphocytes %	42	72	58	44	64	29	43	55	43	35	30	55	38	51	31	41	51	40	60	60
Monocytes %	2	3	2	14	6	7	2	8	5	5	7	3	2	6	6	3	5	14	4	2
Eosinophils %	0	3	3	3	0	6	4	2	3	3	1	1	2	1	1	4	1	1	1	1

* Sahli 100 % = 14·56 g. per 100 c.cm.

It is not yet possible to say whether minor degrees of iron-deficiency anæmia are common, because almost all observations have so far been confined to patients whose symptoms of anæmia have been sufficiently pronounced to cause them to visit a doctor for treatment.

Enough observations have been made on a severe hyperchromic anæmia—chiefly seen amongst pregnant women, and responding well to 'Anahæmin'—to make it tolerably certain that this is a form of nutritional megalocytic anæmia similar to that recorded by Foy and Kondi (1939) in Macedonia. The two most interesting features are: that it is almost confined to Turkish women although there seems to be very little practical difference in diet between the Greek and Turkish villagers; and that in 2 cases it has been accompanied by pellagroid skin eruptions. Pellagra, though uncommon, has been seen in Cyprus during the last few years but has not shown all the signs of the classical disease; in particular the gastro-intestinal symptoms have not been serious. A recent case seen in Paphos district had a severe hypochromic anæmia which reacted well to iron.

TABLE III—MARROW COUNTS (500 NUCLEATED CELLS)

Case no.—	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Red series—																				
Hæmocytoblasts	..	2	..	0	3	3	2	..	3	4	6	2	1	..	1	1	7	0	3	8
Early primary erythroblasts	..	12	..	8	12	29	9	..	17	19	13	18	19	..	11	7	35	8	19	19
Late primary erythroblasts	..	40	..	30	25	64	26	..	44	44	27	76	63	..	24	17	110	19	42	37
Normoblasts	..	392	..	355	324	366	391	..	377	400	378	338	360	..	415	415	295	422	362	381
Leuco-erythrogenetic ratio	..	0·07	..	0·10	0·23	0·05	0·14	..	0·10	0·07	0·13	0·12	0·08	..	0·09	0·10	0·09	0·08	0·10	0·07
White series—																				
Myeloblasts	..	2	..	0	0	0	0	..	2	0	0	0	0	..	0	0	1	0	0	1
Promyelocytes	..	1	..	0	1	0	1	..	1	2	0	3	3	..	2	0	0	0	3	1
Myelocytes—neutrophil	..	4	..	10	7	7	8	..	4	8	8	15	8	..	6	10	11	0	5	4
eosinophil	..	1	..	0	0	0	0	..	4	3	1	0	1	..	0	1	2	0	0	1
basophil	..	0	..	0	1	0	0	..	0	0	0	0	0	..	0	1	0	0	0	0
Proleucocytes—neutrophil	..	20	..	27	72	14	48	..	30	16	47	34	18	..	30	33	25	33	31	22
eosinophil	..	1	..	3	2	2	2	..	3	2	0	1	4	..	4	0	3	2	4	0
basophil	..	0	..	0	1	0	0	..	0	0	0	0	0	..	0	0	0	0	0	0
Granulocytes—neutrophil	..	6	..	35	7	5	8	..	3	1	9	9	17	..	2	11	5	14	17	9
eosinophil	..	0	..	3	0	4	2	..	2	0	1	1	0	..	1	0	5	0	3	2
basophil	..	0	..	0	0	0	0	..	0	0	0	0	0	..	0	0	0	0	0	0
Lymphocytes	..	19	..	28	43	2	3	..	9	1	9	3	5	..	4	4	1	2	10	12
Monocytes	..	0	..	1	2	3	0	..	0	0	1	0	1	..	0	0	0	0	1	2
Plasma cells	..	0	..	0	0	0	0	..	1	0	0	0	0	..	0	0	0	0	0	0
Megakaryocytes	..	0	..	0	0	1	0	..	0	0	0	0	0	..	0	0	0	0	0	0

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SUMMARY

The features of 20 cases of erythroblastic anæmia seen in Cyprus are presented and discussed, including the sternal-puncture findings in 16 of them, and the ætiology.

Clinical details of an adult case of Cooley's anæmia are reported.

An impression of the frequency of other anæmias in Cyprus is recorded.

My thanks are due to the Director of Medical Services, Cyprus, for permission to publish this paper, which formed part of a thesis accepted for the degree of MD of Cambridge University.

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POSTNASAL SWAB IN DIAGNOSIS OF PERTUSSIS

ROBERT CRUICKSHANK, MD ABERD, MRCP
PATHOLOGIST, GROUP LABORATORY, NORTH-WESTERN HOSPITAL, HAMPSTEAD

From the LCC Pathological Service

MANY medical men still need to be reminded that pertussis is one of the most serious of childhood fevers. It is a protracted debilitating disease which affects 60–70% of the child population (Stocks and Karn 1932, Epidemics in Schools 1938) and often leaves behind both physical and psychical damage. In the industrial north and in Scotland pulmonary complications are common and are remarkably resistant to sulphonamide therapy—thus, among cases admitted to the Glasgow fever hospitals the fatality-rate in the biennial epidemic years is still over 17%. The infection has a high attack-rate among infants and young children, in whom the disease is particularly severe, so that half the deaths from pertussis occur in the first year of life (RG report 1938).

Unfortunately, pertussis is a difficult disease for the doctor to recognise in the early stage of the infection; indeed the experienced mother is often the first to make the diagnosis. A spasmodic cough, congestive in type and frequently followed by vomiting, occurring at any time of the day or night and unaccompanied by physical signs in the throat or chest should rouse the doctor's suspicion. But how is this suspicion to be confirmed? A hæmatological examination early in the disease will usually show a leucocytosis with a relative and absolute lymphocytosis; or a plate of Bordet-Gengou medium held in front of the child's mouth during a spasm of coughing will yield the organism in a high proportion of cases. But both these procedures are difficult for the practitioner to do or get done. Therefore, since early diagnosis and isolation is essential to minimise the spread of infection to others, and to prevent the development of complications in the affected child, a ready means of confirming an early clinical suspicion of pertussis is most desirable.

A swab from the child's upper respiratory tract would have many advantages; in particular it could be used for the suspicious case seen at home or in the outpatient department in much the same way as is done for diphtheria. Various earlier attempts with both laryngeal and pharyngeal swabs have, in our experience, yielded poor results in comparison with the cough-plate; mainly because of the profuse growth of organisms other than *H. pertussis*. However, a fresh trial was thought worth while in view of recent American reports (see Saito, Miller and Leach 1942) of good results obtained with a fine swab passed on a flexible wire to the postnasal space through the anterior nares, together with the earlier demonstration by Fleming (1929) and McLean (1937) of the selective resistance of *H. pertussis* to penicillin and the work by Florey and his colleagues (1941) which has made it possible to obtain this substance in a stable form. For the purpose a nasopharyngeal swab passed through the mouth and inoculated on to a "penicillin plate" of Bordet-Gengou medium has been used.

MATERIAL AND METHODS

A consecutive series of patients admitted to the North-Western Hospital with a diagnosis of whooping-cough during the period January, 1942, to August, 1943, had postnasal swabs taken and cough-plates exposed within a few days of admission. Specimens taken between Nov. 24, 1942, and March 18, 1943, have been omitted from the analysis because no penicillin was available during that period. As far as possible both specimens were taken on the same day but sometimes one or other specimen was taken a day or so after the other. The swab was an ordinary metal throat-swab bent within ½ in. of the end. With an assistant to hold the child's head and hands, and using a tongue-depressor, the sister or nurse passed the tip of the swab up behind the uvula and rubbed it on the posterior pharyngeal wall. The swab was then returned to the container, still slightly bent so that the inoculated portion did not rub against the side of the tube. All swabs were taken by the nursing staff, who quickly learned how to do this, but with frequent changes of nurses a proportion of swabs taken by uninitiated nurses were received bent in the middle; these had obviously not reached the postnasal space.

Each plate of the Bordet-Gengou medium (see Mackie and McCartney 1942) was impregnated before use with 4 drops (=0·13 c.cm.) of a suitable dilution of penicillin. The strength of penicillin solution required was judged by the inhibitory effect of different dilutions upon a number of test organisms—staphylococcus, hæmolytic streptococcus, a diphtheroid organism, *M. catarrhalis* and *H. pertussis*—inoculated on the Bordet-Gengou medium. Later it was ascertained by comparison with a standardised preparation of penicillin that 15–25 Oxford units was needed per plate of 12 c.cm. of medium. The weak dilution of penicillin in daily use tended to lose its potency, so that the number of drops had to be gradually increased from 4 to 8. The penicillin was added half to one hour before the plate was to be inoculated, the drops were spread evenly over the plate with a glass spreader and the plate was then dried in the incubator. The postnasal swab was rubbed over about a third of the plate and a platinum loop was used *secumdum artem* to inoculate the material over the rest of the plate. Cough-plates without penicillin were exposed by holding the plate 4 inches in front of the child's mouth during a paroxysm of coughing, allowing 4–6 barks for a child over two years and 10–12 barks for a younger child. About 10% of the cough-plates were over-exposed, underexposed or grossly contaminated. All culture-plates were incubated for 3 days before examination, although colonies of *H. pertussis* could often be seen after 2 days. On the 3rd day the plates were methodically examined with a hand lens; a typical or suspected colony was tested directly for slide-agglutination by picking it off entire, emulsifying it in a drop of saline on a glass slide and adding a loopful of high titre agglutinating serum. If direct slide-agglutination failed, another colony was subcultured on the Bordet medium and the growth tested next day for slide-agglutination.

RESULTS

The results are set out in the table. It will be noted that only 90 our of 250 patients (36%) yielded positive cultures on admission. After allowing for a number of failures to isolate the organism and for a proportion of misdiagnosed cases, this finding means in effect that over 50% of patients with whooping-cough were admitted to hospital after they had ceased to be infectious. Of the 90 positive cases the proportion positive by either cough-

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plate or postnasal swab was about the same, each technique missing some 25–30% of the total positives. There is little doubt that the results with the postnasal swab could have been bettered by greater care in taking the specimen. For example, during a period when positive cough-plates and negative postnasal swabs were occurring I personally swabbed 5 children whose earlier postnasal cultures had been negative; *H. pertussis* was grown from 4 of these.

Another point is that the organisms are usually much more numerous on the swab-plate than on the cough-plate. Donald (1938) found that in 70% of positive cough-plates the total number of colonies of *H. pertussis* was 10 or less. In the present analysis 12·5% of the positive cough-plates and 35·8% of the positive swab-plates grew 50 or more colonies. I had formed the impression that the swab-plate was superior to the cough-plate in the isolation of the organism from younger children. Analysis did not bear this out but the impression was probably due to the frequent finding of a heavy growth of *H. pertussis* on the postnasal swab culture from these young children. Thus 45·1% of swabs from children under 2 years gave a moderate or heavy growth of the organism compared with 27·7% for the older children. These good results with the postnasal swab in young children are particularly encouraging, for if the postnasal swab is sometimes not easy to take in infants a satisfactory cough-plate is much more difficult to obtain. Yet I have had a positive cough-plate from an infant 10 weeks old.

COMPARISON OF COUGH-PLATE AND POSTNASAL PENICILLIN PLATE

Total cases 250; positive 90; per cent. positive, 36

Age (10 wk.–5 year)	CP + P/NP +	CP + P/NP −	CP − P/NP +	Total +ve cases	% CP +	% P/NP +
Total	40	23	27	90	70·0	74·4
Under 2	20	9	11	40	72·5	77·5
2 and over	20	14	16	50	68·0	72·0

CP = cough-plate. P/NP = postnasal penicillin plate.
Under 2 years: 14 out of 31 (45%) of positive postnasal plates grew more than 50 colonies of *H. pertussis*.
2 years and over: 10 out of 36 (28%) of positive postnasal plates grew more than 50 colonies of *H. pertussis*.

During a considerable part of this trial, the postnasal swab was inoculated on to both a plain plate and a penicillin plate of Bordet-Gengou medium, alternate swabs being inoculated first on the plain plate. Of 52 positive swabs on the penicillin plate, only 5 were positive on the plain plate. Again, during the period when penicillin was not available, postnasal swabs were inoculated on to a plain plate only, but although there were 17 positive cough-plates during that time no postnasal swab yielded a positive culture. Thus with the postnasal swab taken through the mouth penicillin is essential to success.

To find whether a delay of 24 hours in culturing the swab after it was taken would interfere with the isolation of the organism, repeat swabs from known positive patients were obtained. After inoculation on penicillin plates, the tip of the swab was rested on about ½ in. of solid saline-agar at the bottom of the glass container and was left on the bench for 24 hours when it was re-inoculated on a fresh penicillin plate. Of 6 swabs that gave positive cultures on primary inoculation 4 were still positive after 24 hours delay; the two negative swabs had each given a scanty growth on the original plate. An opportunity also occurred to examine post-nasal swabs taken at another hospital where they were dipped in saline-agar and sent through the post. Of 6 swabs taken from patients suspected of having pertussis, 4 gave positive cultures. Thus, provided the swab is kept moist *H. pertussis* seems to remain viable for 24 hours, a matter of some importance if this method of diagnosis is to be adopted by the general practitioner.

It may be objected that a method which yields only 67 positive cultures from 250 patients is not likely to commend itself to the practitioner. However, Donald showed that the cough-plate gives over 90% positive results in patients with pertussis during the first three weeks of infection, and Saito and his colleagues found that the postnasal swab, like the cough-plate, gave the highest proportion of positive cultures early in the infection. For the child with the suspicious cough, therefore, the postnasal swab, carefully taken and handed to the laboratory on the same day, should help considerably towards the earlier and more accurate diagnosis of pertussis. A postal service, using a swab resting on solid saline-agar at the bottom of the container—and such an outfit will remain serviceable for several weeks—seems also a reasonable possibility.

SUMMARY

A nasopharyngeal swab taken through the mouth and inoculated on a "penicillin plate" of Bordet-Gengou medium, gives as good results as the cough-plate in the bacteriological diagnosis of pertussis. The method could be readily adopted by the practitioner for early diagnosis of the infection.

I am indebted to Dr. W. Gunn, medical superintendent of the North-Western Hospital, for facilities, and to the nursing staff for active coöperation. Penicillin was kindly supplied by Prof. H. W. Florey and Dr. J. W. Trevan.

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APPARATUS FOR ADMINISTERING OXYGEN

W. I. CARD * MD LOND, MRCP
W. J. GRIFFITHS BSC, PH D LOND
B. A. MCSWINEY, SC D, MB DUBL
St. Thomas's Hospital, London

THE original BLB apparatus, designed by Boothby, Lovelace and Bulbulian (1938) for administering oxygen, consists of three parts: (1) a mask, (2) a reservoir-rebreathing bag, and (3) a connecting device which joins the mask to the bag.

On the side of the metal connecting device an expiratory valve, with a spring under slight tension, permits the escape of expired air in excess of that sufficient to distend the bag, without causing any appreciable resistance to expiration. On the other side of the connecting device is an inlet tube which is connected with the oxygen cylinder. An air-regulating mechanism fitted into the upper part of the connecting device consists of three small holes or ports over which is mounted a rotating sleeve with three similar ports; one or more may be brought into operation by turning the sleeve.

In the course of investigations on the BLB apparatus (Card et al. 1940), it was suggested by Card that the expiratory valve might be unnecessary, as experiments had shown that when one or more ports of the connecting device were open the expiratory valve was not essential. Attempts were made therefore to replace the connecting device by a rubber tube with a hole punched in it.

Investigations were made with an apparatus consisting of a BLB nasal mask, a rubber tube which was connected by metal sleeves with the face-piece, and the reservoir-rebreathing bag. It was found by trial and error that if a hole was bored in a tube having a wall 3 mm. thick with a cork-borer of 7 mm. diameter, the arrangement was efficient: a high concentration of oxygen was obtained in alveolar air samples with a flow of 3 or more litres a minute, and the subject experienced no embarrassment in respiration (fig. 1).

Oxygen enters the apparatus by means of a tube inserted in the vent at the side near the top of the bag. The gases from the bag mixed with the air drawn through the hole are inhaled by the patient. The volume of air

* Major Card was not available for consultation when this paper was being prepared.

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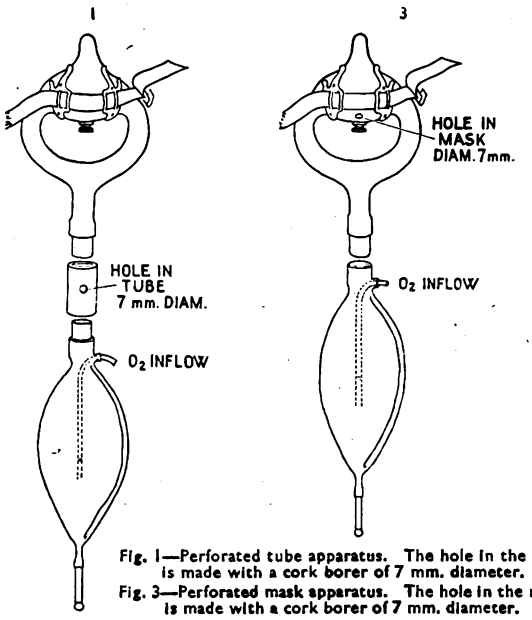

Fig. 1—Perforated tube apparatus. The hole in the tube is made with a cork borer of 7 mm. diameter.
Fig. 3—Perforated mask apparatus. The hole in the mask is made with a cork borer of 7 mm. diameter.

entering the apparatus with each breath depends on the oxygen inflow and the depth of respiration. The first part of the expired air passes into the bag, where it is mixed with the incoming oxygen from the cylinder, and when the bag becomes distended the remainder of the expired air escapes through the hole.

Repeated observations were made on the three subjects listed in table I to obtain information about the concentration of oxygen in the alveolar air and the percentage of CO_2 in the bag with different flows of oxygen.

TABLE I—PHYSICAL DATA OF SUBJECTS

Subject	Sex	Age	Weight (kg.)	Height (cm.)	Vital capacity (litres)	Resp. rate per min.	Tidal air (c.cm.)
A	M	63	70	168	2·65	12	555
B	M	46	76·4	177	4·0	11	450
C	F	25	50·9	157	3·3	14	297

After the subject had rested supine for 15 minutes some two or three hours after taking food, the mask was fitted to the face and the oxygen flow adjusted. After oxygen had been administered for 15 minutes, the mask was removed and an inspiratory alveolar air sample collected. The mask was then replaced and the procedure repeated until samples of alveolar air had been obtained with flows of 3, 4, 5, 6 and 7 litres of oxygen per minute. The analysis of the samples was carried out in a small Haldane gas-analysis apparatus. Observations were made on the same subject on different days, and the figures given with any one flow represent the average of a number of determinations. The results are presented in table IIA and fig. 2.

Samples were also collected, under conditions as described above, to obtain information about the percentage of CO_2 in the bag at the end of expiration. To obtain the sample a tube was inserted into the bag through the lower vent. At the end of expiration the neck of the bag was tied off quickly and a sample collected in an evacuated sampling tube. The average of a number of determinations is given in table IIB and fig. 2.

It will be observed that the highest concentrations of oxygen were obtained with the subject who had the smallest tidal air. The O_2 concentration in random alveolar air samples given by male subjects, ages 20 to 45, fell between the maximum and minimum, and usually corresponded to the average results given in table II. It was possible to demonstrate that, towards the end of inspiration, air was drawn into the apparatus, particularly with low flows of oxygen. At the end of expiration, when the bag was distended, expired air escaped through the opening in the tube.

Attempts to improve the efficiency of the apparatus proved unsuccessful. It was found that when the hole was made smaller, resistance to breathing was encountered. On the other hand, if the diameter of the hole was greater than 7 mm. the alveolar concentration with any given flow of oxygen was decreased. Alterations in the nature of the hole had little or no effect on the performance of the apparatus.

In subsequent experiments the nasal mask was connected with the reservoir-rebreathing bag and a hole was bored with a cork-borer of 7 mm. diameter in the front of the face-piece just below the strap (fig. 3). It was thought at first that patients would object to this arrangement as the air drawn into the apparatus at the end of inspiration cools the face. The effect has proved, in some instances at least, to be of benefit, as the air tends to decrease sweating.

TABLE II—PERFORATED TUBE

(A) ALVEOLAR AIR O_2 PERCENTAGES

Subject	O_2 flow per minute (litres)				
	3	4	5	6	7
A	50·3	58·4	65·4	76·0	74
B	57·5	64·8	72·8	75·0	78·4
C	62·0	73·5	81·5	86·5	89·5
Average	56·6	65·6	73·2	79·2	80·6

(B) PERCENTAGE CO_2 IN BAG AT END OF EXPIRATION

Subject	O_2 flow per minute (litres)				
	3	4	5	6	7
A	1·59	1·20	1·05	0·73	0·65
B	0·58	0·47	0·38	0·18	0·13
C	1·42	1·37	0·85	0·75	0·42
Average	1·20	1·01	0·76	0·55	0·40

Observations were again made on subjects A, B and C using this modified mask (table I). The results of these studies are given in tables IIIA and B and fig. 4.

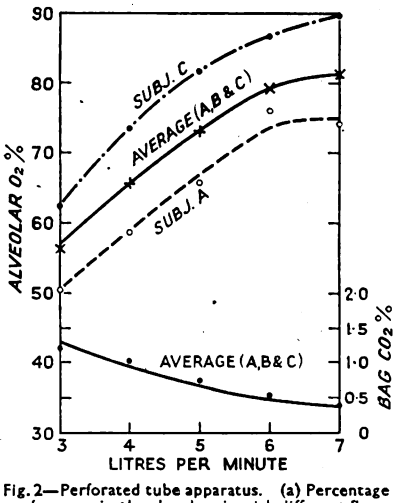

Fig. 2—Perforated tube apparatus. (a) Percentage of oxygen in the alveolar air with different flows of oxygen: upper curve, subject C; lower curve, subject A; middle curve, average of subjects A, B and C. (b) Percentage of CO_2 in the reservoir-rebreathing bag at the end of expiration (subjects A, B and C). (Table II.)

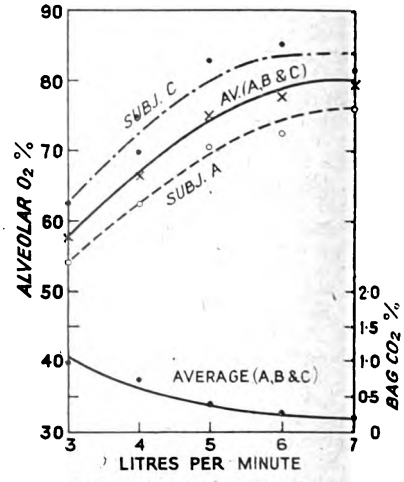

Fig. 4—Perforated mask apparatus. (a) Percentage of oxygen in the alveolar air with different flows of oxygen: upper curve subject C, lower curve, subject A, middle curve average of subjects A, B and C. (b) Percentage of CO_2 in the reservoir-rebreathing bag at the end of expiration (subjects A, B and C). (Table III.)

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TABLE III—PERFORATED MASK

(A) ALVEOLAR AIR O_2 PERCENTAGES

Subject	O_2 flow per minute (litres)				
	3	4	5	6	7
A	54·7	62·5	70·9	72·7	76·2
B	56·6	67·5	72·1	75·8	81·5
C	62·7	69·8	83·1	85·2	81·7
Average	58·0	66·6	75·4	77·9	79·8

(B) PERCENTAGE OF CO_2 IN BAG AT END OF EXPIRATION

Subject	O_2 flow per minute (litres)				
	3	4	5	6	7
A	1·75	1·21	0·63	0·24	0·21
B	0·08	0·12	0·09	0·18	0·05
C	1·21	1·01	0·49	0·34	0·32
Average	1·01	0·78	0·40	0·25	0·19

Observations made on other normal subjects agree well with the average results given in table III.

The figures given for the perforated tube and mask compare favourably with those previously obtained using the BLB apparatus with one hole open (table IV).

TABLE IV—AVERAGE ALVEOLAR AIR O_2 PERCENTAGES

Apparatus	O_2 flow per minute (litres)				
	3	4	5	6	7
BLB with one hole open	61	70	77	81	86
Perforated tube ..	56·6	65·6	73·2	79·2	80·6
Perforated mask ..	58·0	66·6	75·4	77·9	79·8

The alveolar oxygen percentages using the BLB inhalation apparatus with two holes open are lower than those obtained with the perforated tube and perforated mask models.

The new models are fitted to the patient in the same way as the original BLB apparatus. It must be emphasised, however, that a flow-meter is an essential part of the equipment with either type as the oxygen flow per minute must be measured. To sterilise the apparatus after use, the parts should be washed with soap and water, boiled for five minutes, and dried.

Clinical reports on these models have been very satisfactory. They have been found easy to handle and are well tolerated by the patients.

During these investigations an account of an improved BLB apparatus was published by Boothby, Lovelace and Uihlein (1940). In the new model the metal connecting device has been omitted and a turret or holder moulded into the down tube of the mask to hold the valve which consists of a finely grained rubber disc. The mask is connected with the reservoir-rebreathing bag which receives the oxygen direct.

Our best thanks are due to Dr. J. Forest Smith for advice and encouragement. We are also indebted to the late Dr. D. H. de Souza for much valuable assistance. We wish to acknowledge the facilities provided for this work by officers of the Emergency Medical Service and the Surrey County Council.

The expenses of this investigation have been defrayed in part by a grant from the Government Grant Committee of the Royal Society.

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ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE.—The lectures to be given at the institute on Wednesdays during February and March (*Lancet*, Jan. 22, p. 138) will take place at 3.30 PM and not at 3 PM.

THIOUREA CAUSING GRANULOPENIA AND THROMBOPENIA

P. B. NEWCOMB
M B LOND
MEDICAL REGISTRAR

E. W. DEANE
MRCS
HOUSE-SURGEON

LONDON HOSPITAL ANNEXE

THIOUREA has hitherto been regarded as relatively innocuous, but in the following case it seems to have produced toxic effects on the bone-marrow.

CASE-RECORD

A woman, aged 44, was admitted to hospital complaining of nervousness, sweating, palpitations and hot flushes which had been getting worse for the last year. She had been given medicine for "thyroid trouble" 3 years before.

She had a moderately severe degree of thyrotoxicosis, with the nervous elements more in evidence than the cardiovascular signs. She was very emotional, and her skin was flushed and moist; pulse-rate 100 per min. There was well-marked bilateral exophthalmos with some conjunctival injection. There was diffuse enlargement of the thyroid which was smooth and firm. Treatment was started with a phenobarbitone and bromide mixture for a week, and during this time the pulse-rate varied between 100 and 84 per min.

Whether thiourea will be used as a long-term treatment in place of surgery remains to be seen, but it suggests itself as a good method of preoperative treatment, and in this case it was decided to compare its effects with those of the routine iodine premedicatiom. Accordingly, thiourea was now begun with a dosage of 1 gramme t.d.s. for 3 weeks. During this time she remained well apart from a mild attack of influenza which was then epidemic. The fever lasted for 4 days.

About 10 days after thiourea had been started the signs of hyperthyroidism began gradually to improve—she became less emotional and the pulse settled to a constant rate of about 80 a minute. The dosage of thiourea was now lowered to 1 g. b.d. for a week, and then 1 g. daily, during which time the improvement was maintained although it was not as great as might have been expected from iodine. However, since the patient was averse to operation it was decided to continue with thiourea. A fortnight after the drug had been started a leucocyte-count showed a total of 9200 with 70% granulocytes and a normal differential count.

After a total of 83 g. had been given—i.e., after 5 weeks treatment with thiourea—she suddenly had two epistaxes and then developed generalised purpura and ecchymoses with purpuric spots on the buccal mucous membrane which ruptured leaving painful ulcers. The spleen was not palpable. Thiourea was immediately stopped and next day the ecchymoses had become more numerous and there was bleeding from the gums. A blood-count at this time showed red cells 4,500,000 per c.mm.; Hb. 87%; white cells 4100 per c.mm. with 24% granulocytes. The platelet count was 18,000. Bleeding-time was greatly prolonged and even at the end of 4 hours the bleeding from the puncture wound showed no signs of stopping. Coagulation-time was normal. Sternal puncture showed a marrow which was quite cellular; the differential count showed 7% polymorphs, 16% lymphocytes, 44% myelocytes, 10·5% myeloblasts; there were 39% erythroblasts and 48% normoblasts. Platelets were scanty and 2 megakaryocytes were seen. Since many myelocytes were present the prognosis was thought to be good.

By the second day after the purpura was first observed the leucocytes had fallen to 3700 per c.mm. with 16% polymorphs, and there were only 9000 platelets. She was therefore transfused with a pint of fresh whole blood and all bleeding from the gums ceased 10 minutes after the transfusion had started. Pentnucleotide, 10 c.cm. t.d.s., was also started but was discontinued after six doses because it caused some pyrexia.

Subsequent blood-counts have shown a gradual return to normal, and the latest count taken 12 days after the appearance of the purpura showed a leucocyte-count of 6200 per c.mm. with 36% granulocytes, and 67,000 platelets per c.mm. The purpura and ecchymoses have faded and there has been no further hæmorrhage.

During the time this patient was in hospital no other drugs were given and it seems fairly certain that the toxic effects were due to thiourea.

We would like to thank Mr. Hermon Taylor for allowing us to publish details of this case.

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VITAMIN-C NUTRITION IN A HOSPITAL

WITH OBSERVATIONS ON A CASE OF SCURVY

F. T. G. PRUNTY, M B CAMB, M R C P
C. C. N. VASS, M S C, M B, P H D LEEDS

From the Departments of Pathology and Physiology, St. Thomas's Hospital Medical School, London

Harris (1942a, 1943) has carried out investigations on the vitamin-C nutrition of school-children and others, Francis and Wormall (1942) on a group of medical students, Payne (1943) on groups of normal children and children in hospital, and Flowerdew and Bode (1943) on groups of subjects in an internment camp. Our paper deals with groups of hospital inpatients and (for comparison) some members of the nursing staff and a few healthy males attached to the hospital, at different periods of the year, the total number of subjects examined being 53.

Paterson and Daynes (1941) state that scurvy has increased in London since the war, but this has not been our experience. The case here recorded is of interest because it is not entirely attributable to a war-time dietary, but chiefly to a diet employed in the treatment of a gastric ulcer. It affords further evidence on the length of the latent period before the appearance of scorbutic symptoms.

TECHNIQUE

Plasma determinations of ascorbic acid were made on samples of blood taken at least 3 hours after the preceding meal; 10 c.cm. of blood was withdrawn from a vein without hæmolysis, into a tube containing 0·1 c.cm. of 20% potassium oxalate and 0·05 c.cm. of 5% potassium cyanide.[1] After rapid centrifuging, 16 c.cm. of 3% freshly prepared metaphosphoric acid was added to 4 c.cm. of plasma and the mixture centrifuged. Then 5 c.cm. aliquots of the supernatant fluid were titrated with 0·01% 2:6 dichlorphenolindophenol made in freshly glass distilled water and standardised against ascorbic acid. This method is capable of giving figures to within ± 0·025 mg. of ascorbic acid per 100 c.cm. plasma when the operator has attained practice in recognition of the end-point: this consists of the first persistence of a pink coloration in the solution. Duplicate values of this order can be obtained even when the individual titrations are carried out by different observers. Check experiments have given recoveries of 98% of ascorbic acid added to the plasma.

Estimations of ascorbic acid in urine were carried out by the method of Harris and Ray (1935), the 24-hourly saves being collected in dark-coloured winchesters containing 70 grammes metaphosphoric acid. The test doses were administered in tablet form employing 50 mg. tablets. These doses were approximated as nearly as possible to a standard of 700 mg. per 10 st. body-weight, in so far as the use of these tablets allowed. They were given in divided doses, morning and evening, to minimise renal overflow. The criterion of saturation was the excretion of a third of the test dose in 24 hours.

RESULTS

The plasma values of 17 hospital inpatients taken at random were determined in the period May to July, 1942, and 15 during the period September and October. The results are given in table I. From the evaluation of our data these values can be calculated in terms of the number of days required to saturate the patients (table II).

Case 33 in table I gave a history that the greater part of her small diet consisted of fresh fruit and vegetables; and good plasma levels have been similarly accounted for in other cases of anorexia nervosa.

Table III shows the plasma values determined in small groups of healthy adult males and nurses attached to the hospital, but the values serve to bring out the poorer nutrition of the hospital inpatients.

The high values obtained in two subjects in the period May–July were due to the fact that they were consuming a very large amount of soft fruit and salads direct from their own gardens, whereas the hospital diet did not contain these in any quantity. In general those subjects living in hospital were distinctly less well supplied with vitamin C than the others as the figures show. The group of nurses living in the hostel were obtaining better cooked vegetables than those in hospital, and stored apples were available for them.

1. Our experiments have shown that potassium cyanide has no interfering action in the estimation of ascorbic acid and does prevent the oxidation which occurs before the plasma is separated. Periods of one hour elapsed before the determinations could be done in the case of scurvy, but the blood was kept on ice during this period to minimise loss.

TABLE I—PLASMA VALUES OF ASCORBIC ACID IN 32 HOSPITAL INPATIENTS AT DIFFERENT TIME OF THE YEAR

A.—MAY TO JULY INCLUSIVE

Case	Sex	Diagnosis	Date 1942	Diet and remarks	Days in hospital	Plasma ascorbic acid (mg. per 100 c.cm.)
1	M	Gastric ulcer, hæmatemesis	May 20	Meulengracht	21	0·10
2	M	Pleural effusion	20	Light; previously good‡	12	0·10
4	M	Gastric ulcer	June 5	Sippy; previously good‡	10	0·00
6	M	Melæna, ? cause	19	Hospital	3	0·18
7	M	Gastric ulcer	30	Meulengracht	22	0·04
8	F	Catarrhal jaundice	July 1	Hospital	8	0·18
9	M	Benign pyloric obstruction	1	Meulengracht	23	0·05
10	F	Non-toxic goitre, 4 mth. pregnant (BMR + 8%)	1	Hospital	6	0·13
11	M	Diabetes mellitus, phthisis	1	Carbohydrate 200 g.	7	0·10
12	M	Hypertension	1	Hospital	2	0·30
13	M	Subacute bacterial endocarditis	3	Hospital §	18	0·00
14	F	Post-thyroidectomy tetany	7	Hospital	12	0·21
15	F	Diabetes mellitus	10	Carbohydrate 200 g.	17	0·20
16	M	Mild diabetes mellitus, intermit. claudicn	15	Hospital	6	0·05
17	M	Fractured femur	15	Hospital	2	0·21
18	M	Streptococcal throat, purpura	20	Hospital §	4	0·00
19	F	Myxœdema (BMR − 29%)	29	Hospital	2	0·13
						Av.: 0·12

B.—SEPTEMBER AND OCTOBER

22	F	Myxœdema (BMR − 18%)	Sept. 1	Hospital	20	0·10
23	M	Chronic bronchitis	1	Hospital ‡	3	0·65
24	M	Pyæmia	1	Hospital, and ‡ orange daily for fortnight	42	0·36
25	M	Pseudobulbar palsy	2	Hospital	14	0·15
26	F	Vertigo	2	Hospital	7	0·03
27	F	Acute nephritis	8	Low protein	21	0·20
28	M	Banti's syndrone	8	Hospital	21	0·15
29	M	Gastric ulcer	8	Meulengracht	40	0·05
30	M	Carotid body tumour	8	Hospital ‡	21	0·41
31	M	Disseminated sclerosis	8	Hospital	35	0·15
32	F	Carcinoma of lung	9	Hospital	21	0·26
33	F	Anorexia nervosa	6	Hospital ‡	7	0·62
34	M	Enlarged prostate	18	Hospital	2	0·23
35*	M	? Cirrhosis of liver	Oct. 31	Hospital	12	0·08
36†	F	Multiple abdominal sinuses (chronic inflammatory)	Nov. 1	Hospital	49	0·26
						Av.: 0·24

* For full clinical report see Prunty (1943).
† Exploratory operation 1 month before.
‡ Vitamin-C intake above average before admission.
§ Receiving sulphapyridine.

TABLE II—CALCULATED NUMBER OF DAYS REQUIRED TO SATURATE THE PATIENTS LISTED IN TABLE I

Period	Subjects	Days to saturate						Saturated in 2 days (%)
		1	2	3	4	5	6 and over	
May–July	17	0	1	5	5	3	3	6
Sept.–Oct.	15	2	2	6	3	1	0	27

A CASE OF SCURVY

A mechanic, married, aged 27, weight 9 st. 5 lb., was admitted to hospital on May 30, 1942, complaining of a rash on his shins for a month, painful swelling of the left forearm and left leg for a week, and swelling of the legs for 2 days. For some time previously he had suffered from a cramp-like pain in the left leg and shoulder. Two years before he had a hæmatemesis; 6 months before there was sudden onset of

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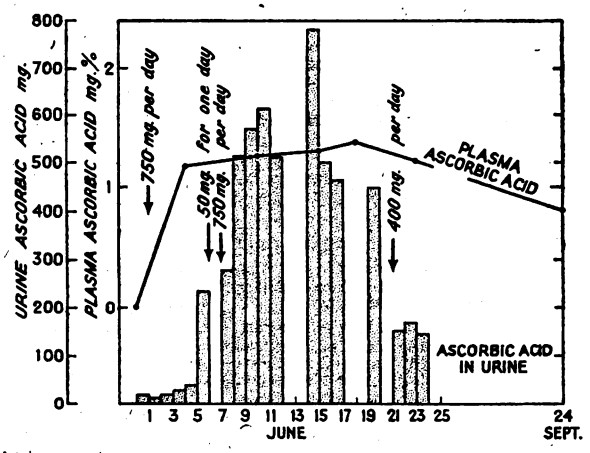
gastric ulceration demonstrated radiologically. Before that event he had reverted to a normal diet, but since the ulcer had developed he had lived on a diet of 2 pints of pasteurised milk, porridge, fish, dry toast, butter and chocolate daily.

On examination he did not look ill; his gums were edentulous but otherwise normal, but the soft palate was erythematous and slightly œdematous. A small healed ulcer was present on the buccal surface of the lower lip. The lower parts of the legs were covered with very large numbers of small petechiæ, especially on the anterior aspect. Œdema of both ankles was considerable, and the left calf was slightly swollen and somewhat tender. Ecchymoses, 4 cm. in diameter, were found on the inner side of both ankles. Follicular hyperkeratosis was noted particularly on the outer sides of both thighs and across the lumbar region. Knee- and ankle-jerks were extremely brisk and the plantar reflexes dorsal. There was no evidence of hyperæsthesia. Ecchymoses, 7 cm. in diameter, were present in the right antecubital fossa and on the palmar surface of the right wrist. There was some tender swelling deep to the extensors of the left forearm and there was fixed flexion of 160°. Hyperkeratotic papules were present on the dorsal surfaces of both upper arms. Pulse-rate 80, blood-pressure 130/70. There was no X-ray evidence of subperiosteal hæmatoma in arms or legs.

Capillary fragility test: after 3 min. at 100 mm. pressure 30 petechiæ were produced in an area approximately 6 cm. in diameter in the left antecubital fossa. Blood-count; red cells 4,390,000; Hb. 70% (Haldane); colour-index 0·79,



Urine and plasma levels of ascorbic acid on different days in the patient with scurvy. The urine ascorbic acid was not determined on days 6, 12, 13, 17, 18 and 20. A maintenance dose of 50 mg. of ascorbic acid was given on day 6. Patient's weight, 9 st. 5 lb.

white cells 5830 with a normal differential count, platelets 280,000. Bleeding-time was normal.

After daily treatment with 750 mg. ascorbic acid in doses of 400 and 350 mg. at 12-hour intervals, the hyperkeratotic papules disappeared within 7 days and the petechiæ and ecchymoses had largely faded; 18 days later Göthlin's capillary fragility test produced only 3 petechiæ. No vitamin P was administered (cf. Scarborough 1940).

For comparison with the data obtained on non-scorbutic subjects (Prunty and Vass) a prolonged saturation test was carried out on this patient (see figure). It was begun the afternoon after the patient's admission and shows—like other subjects we have examined, and as Harris (1942b) has pointed out—wide fluctuations in the day-to-day excretions of ascorbic acid after the attainment of saturation. The corresponding plasma values are however relatively constant during the period when saturated, and above the saturation level. This is further support for the contention of Harris that these fluctuations in no way invalidate the test.

Reduction of the test dose from 750 mg. to 400 mg. per day, after a total dosage of 13·5 g. of ascorbic acid, resulted in an excretion of well over a third of the daily dose. Correspondingly the plasma level change was only from 1·38 to 1·22 mg. per 100 c.cm. After discharge from hospital on June 24, 1942, the patient lived on a diet rich in salads and vegetables with a supplement of 75 mg. of ascorbic acid weekly, and on Oct. 24 the plasma level was 0·81 mg. per 100 c.cm., which is the concentration at the state of saturation (Prunty and Vass 1943).

TABLE III—PLASMA ASCORBIC ACID VALUES IN NURSES (A) AND HEALTHY ADULT MALES (B) AT DIFFERENT TIMES OF THE YEAR

A.—HOSPITAL NURSES, FEBRUARY, 1943

—	Nurse no.	Plasma ascorbic acid (mg. per 100 c.cm.)		—	Nurse no.	Plasma ascorbic acid (mg. per 100 c.cm.)	
(a) Resident in a hostel (students)	1	0·50	Av. 0·40	(b) Resident in hospital (staff nurses)	5	0·05	Av. 0·16
	2	0·35			6	0·15	
	3	0·40			7	0·25	
	4	0·40			8	0·20	

B.—HEALTHY MEN

MAY–JULY INCLUSIVE				AUGUST–OCTOBER INCLUSIVE			
Man no.	Date 1942	Diet	Plasma ascorbic acid (mg. per 100 c.cm.)	Man no.	Date 1942	Diet	Plasma ascorbic acid (mg. per 100 c.cm.)
9	May 12	good	0·15	16	Aug. 31	good	0·76
10	July 11	good	1·13	18	Sept. 1	hosp.	0·36
11	,, 24	good	1·15	19	,, 2	hosp.	0·31
12	,, 15	good	0·33	20	,, 2	hosp.	0·57
13	June 5	hosp.	0·05	15	,, 2	good	0·62
14	July 15	hosp.	0·13	17	,, 9	good	0·77
				10	Oct. 28	good	1·01

On admission, the plasma level of ascorbic acid was the expected one of 0·0 mg. per 100 c.cm. However we have several times recorded this value in non-scorbutic subjects. Case 4, table I, is a case in point and was saturated in 8 days with a total dose of 4900 mg.[2] ascorbic acid per 10 st. body-weight. Our scorbutic patient was saturated with a total dose of 4300 mg. per 10 st. in 6 days. Schultzer using a slightly different technique saturated his patient with scurvy with a total dosage of 4700 mg. ascorbic acid per 10 st., the greater part of this amount being in large doses. Ralli and Sherry (1941) have suggested that the continued administration of large amounts of ascorbic acid is necessary to produce saturation in developed scurvy, but the attainment of saturation of our scorbutic was at least as rapid as in case 4 with no such symptoms.

The latent period before the development of symptoms of scurvy can be assessed fairly accurately. The duration of the ulcer diet was 6 months, the only source of

TABLE IV—CALCULATED NUMBER OF DAYS TO SATURATE THE SUBJECTS LISTED IN TABLE III

—	Period	No. of subjects	Days to saturate						Saturated in 2 days %
			1	2	3	4	5	6 or over	
Nurses in hostel	Feb. 1943	4	0	4	0	0	0	0	100
Hospital	Feb. 1943	4	0	0	2	1	1	0	0
Healthy men	May–July 1942	6	2	1	0	2	1	0	50
	August–Oct. 1942	7	4	2	1	0	0	0	86

vitamin C being winter pasteurised milk, 1–2 pints daily, supplying minimal amounts of vitamin C (not more than 4 mg. per day). This period of 180 days is therefore in fair agreement with the period noted by Crandon et al. (1940) in which 161 days elapsed before the appearances of hæmorrhages. Rietschel and Mensching (1939) showed that a scorbutic diet for 100 days was of insufficient duration for the production of symptoms.

DISCUSSION

The results obtained with hospital inpatients reflect the well-known seasonal variation of vitamin C in the

2. These doses are calculated from the dose administered so as to show the amount of ascorbic used per 10 st. body-weight, to bring to the precise point of a third excretion (Prunty and Vass 1943). Fractions of days have not been considered, the day of attainment of a third excretion being given.

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dietary (Harris and Olliver 1943). None of the patients received supplements of ascorbic acid. The average plasma value in September and October (0·24 mg. per 100 c.cm. is double that in May–July (0·12 mg. per 100 c.cm.), representing saturation in 3 and 4 days respectively. Harris and Olliver state that in their experience members of the poorer households require 4 days to become saturated in the winter months. The group of healthy men and nurses show a better standard of nutrition both early and late in the year, although those living in hospital are not so well off in this respect (King Edward's Hospital Fund for London 1943). The findings in general well corroborate those of Harris (1942a), Francis and Wormall (1942), Payne (1943), Flowerdew and Bode (1943) and Crane and Woods (1941) in America. Payne, and Flowerdew and Bode, also found that the hospital inpatients they studied were the least well supplied with vitamin C. This is the end-result of several factors, the chief being the past dietetic history of the patients, the ward diet in hospital, and the pathological processes affecting the patients (infective conditions being well known to increase the requirement for vitamin C). The present investigation shows the substandard condition of these patients and especially emphasises the need for ascorbic acid supplements for those suffering from infective conditions and gastric ulcers. The investigations of Harris (1942a) and of Francis and Wormall (1942) indicate that the wartime dietary is in part responsible for this state of affairs.

Ungley (1943) quotes the plasma ascorbic acid values of 4 sailors who received an average of 24 mg. of ascorbic acid per day for the preceding 2 weeks, the average value being 0·2 mg. per 100 c.cm. In our experience this is equivalent to saturation in 3 days and is in good agreement with the findings of Harris (1943) that intakes of 20 to 25 mg. per day produce second and third day responses. Evidence is presented elsewhere that a plasma level of 0·4 mg. per 100 c.cm. (provided that there has not been a recently abnormally high intake of the vitamin) which is equivalent to a good saturation response in 2 days, is an indication of a satisfactory standard of vitamin-C nutrition (Prunty and Vass 1943). Even in the best season of the year the hospital inpatients fell short of this. In harmony with the views of Zilva (1936) the subjects considered in this section did not show any evidence of subclinical scurvy. Rhinehart and Greenberg (1942) however favour its existence.

The fact that saturation was attained more rapidly in the scorbutic patient than in a patient with gastric ulcer but no symptoms of scurvy, but who also had a plasma level of 0·0 mg. per 100 c.cm., emphasises the impossibility of diagnosing scurvy either by determination of the plasma ascorbic acid or by urinary saturation tests alone. Further, the failure to observe signs of subclinical scurvy in this survey substantiates the view that a substandard intake of vitamin C is not necessarily equivalent to a clinical deficiency (Harris 1943). Chemical examination does however indicate the possible danger of the onset of scorbutic symptoms at some future time and helps to confirm clinical diagnosis. Harris has stated that about 7–10 days are necessary to saturate a scorbutic subject, and the 6 days required in this case is in fair biological agreement. We believe that the plasma level must fall to zero before symptoms of scurvy appear, differing in this respect from van Eekelen (1936) and Abt (1941), both of whom refer to the possibility of scurvy with plasma levels between 0·0 and 0·5 mg. per 100 c.cm.

SUMMARY

Evidence for suboptimal intakes of vitamin C, under prevailing conditions, most serious in the early months of the year, is presented in a group of unselected hospital inpatients. Control experiments were carried out with normal subjects who were better off in this respect.

A case of scurvy is described. It is confirmed that scurvy cannot be diagnosed on a basis of plasma ascorbic acid or urinary saturation tests alone, although chemical tests afford evidence of the danger of the onset of scorbutic symptoms, and are of confirmatory value where clinical evidence suggests a diagnosis of scurvy.

Our thanks are due to the physicians of St. Thomas's Hospital for access to their cases, to Dr. H. J. Wallace for facilities in connexion with the case of scurvy, and the patients and nursing staff for their willing coöperation.

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MENISCECTOMY IN SOLDIERS

REVIEW OF CASES DISCHARGED FROM AN ARMY CONVALESCENT DEPOT

J. J. R. DUTHIE
M B ABERD, M R C P E
MAJOR RAMC

J. G. MACLEOD
M B EDIN, M R C P E
CAPTAIN RAMC

SPECIALISTS IN PHYSICAL MEDICINE, SCOTTISH COMMAND

IN a previous article[1] we reported the results of removal of one or more of the semilunar cartilages in 186 soldiers. The data are summarised in table I.

TABLE I—IMMEDIATE RESULTS OF REHABILITATION AT CONVALESCENT DEPOT

Cases analysed		179
(7 cases readmitted to hospital from the depot)		
Men A1 on admission to depot		134
A1 men downgraded before discharge	12	
Men discharged in category A1	122	
Men in categories below A1 on admission		45
Men below A1 upgraded before discharge	7	
Men below A1 downgraded further before discharge	2	
Men in same category on discharge as on admission	36	

In order to ascertain the fate of these men on return to active duty, we sought information about their present category from their record offices six months or more after their discharge from the depot. This information was obtained in respect of 168 of the original 186 cases, and is analysed in tables II and III.

TABLE II—REVIEW OF 168 CASES SIX MONTHS TO ONE YEAR AFTER RETURN TO DUTY

			%
Men A1 on discharge from depot		119	
A1 men downgraded since discharge	32		27
Men still A1	87		73
Men in categories below A1 on discharge from depot	49		
Men below A1 further downgraded since discharge	19		39
Men below A1 in same category as on discharge	30		61

In men who have been downgraded since their discharge from the depot, we were not able to ascertain the disability necessitating the lowering of their category; but, for the purpose of this survey, it has been accepted that in most cases it was due to a failure in the knee to stand up to the strain of full activity in a unit. The fact that 27% of the men discharged as A1 have been downgraded since their return to duty suggests that the standards set in the convalescent depot for A1 fitness may not have been high enough. Every man discharged in category A1 had undergone a strenuous course of physical training, including an assault course of reasonable difficulty, and had completed a 3 miles' cross-country run and a 15 miles' route march, without reaction in the knee. These criteria were regarded as sufficient to justify a return to full duty in category A1; but perhaps there was some residual instability which when intensive quadriceps exercises were stopped again gave rise to symptoms.

1. *Lancet*, 1943, i, 197.

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TABLE III—ANALYSIS OF 51 CASES DOWNGRADED SINCE DISCHARGE FROM DEPOT

Category on discharge from depot	Category 6 months or more after discharge						
	A2	B1	B2	B7	C	E	Cases
A1 ..	2	1	12	12	3	2	32
A2 ..	..	2	4	4	..	..	10
B1 ..	..	..	1	..	..	1	2
B2 ..	..	..	..	1	1	1	3
B7 ..	..	..	..	..	..	1	1
C ..	..	..	..	..	..	3	3
Total ..	2	3	17	17	4	8	51

Since the publication of our previous paper, undue anteroposterior mobility, presumably due to laxity of the anterior cruciate ligament, has been noted in a high proportion of cases with persistent effusion after meniscectomy. In an apparently sound knee there may be slight anteroposterior mobility, which is well compensated for while quadriceps exercises are being carried out daily. When the knee is again subjected to the multiple traumata of active service, and when quadriceps exercises are no longer performed daily, this instability may cause a recurrent effusion. Once the vicious circle of effusion and quadriceps wasting has started, the knee will steadily deteriorate, and downgrading will become inevitable.

SUMMARY

The categories of 168 cases were ascertained 6–12 months after their discharge from an Army convalescent depot.

Of 119 discharged in category A1, 32 (27%) had been downgraded. Of 49 discharged in categories below A1, 19 (39%) had been further downgraded.

It is suggested that, after meniscectomy, minor degrees of instability of the knee, possibly due to laxity of the anterior cruciate ligament, may persist. In the absence of regular quadriceps exercises this may result in a disability.

Medical Societies

ROYAL SOCIETY OF MEDICINE

ON Jan. 25 the Section of Medicine, with Dr. GEOFFREY EVANS, the president, in the chair, considered

The Clinical Approach to Industrial Medicine

Dr. DONALD HUNTER thought it remarkable that hospitals and universities have done so little to study the effects of occupation upon health. Perhaps Hippocrates was to blame, for he assumed that the patient had nothing to do but to eat, drink, and amuse himself.

Since the passing of the Factory Act in 1844 conditions in British industry have compared very favourably, said Dr. Hunter, with those in any other country. The Factory Department of the Ministry of Labour is doing excellent work under difficult conditions; it has 387 lay and 13 medical inspectors to deal with some 250,000 establishments covered by the Acts. But every 20th century physician must know something of the dangers which may occur in the chemical, aircraft, munitions, textile, and plastics industries. The present rate of industrial development demands the frequent discovery of new materials, and the doctor practising in an industrial area may have to deal with patients exposed to substances which until lately were little more than chemical curiosities, including aromatic nitro- and amino- compounds, chlorinated hydrocarbons, ketones, and glycol derivatives, some of which are harmless and others so deadly that their use might with advantage be forbidden. Some are absorbed by inhalation, others through the skin; some attack the liver, causing toxic jaundice, others the kidneys, causing suppression of urine; some affect the blood, causing methæmoglobinæmia with lilac cyanosis; others attack the bone-marrow, causing thrombocytopenia, leucopenia, and even aplastic anæmia. Fortunately such diseases are not common; for example no case of poisoning by coal-tar benzene has ever been admitted to the London Hospital, and current investigation of the benzene hazard in the dope shops of aircraft factories shows that there is no more anæmia in the girls who use the spray guns than in control subjects.

The clinician, wherever he works, must know something of the chemistry of industrial processes, and of the toxicological risks in dangerous trades. He must know that the metallic poisons have entirely different effects depending on whether they exist in organic or inorganic form, whether their physical properties are those of a solid, a liquid or a gas, whether the valency of the metal radicle is high or low, and whether they fall upon the skin or enter the body through the respiratory or alimentary tracts. For instance, the well-known symptoms of poisoning by inorganic compounds of lead are absent in men poisoned by tetra-ethyl lead; absorption of this lipoid-soluble compound through the skin gives rise to restlessness, talkativeness, ataxia, insomnia, delusions and mania, but not to wrist-drop, colic, or anæmia.

The industrial doctor of the future must have close links with the main chain of general medicine. Academic centres of industrial medicine will arise, as in the new organisation set up by the Medical Research Council in the London Hospital. In several of the larger industrial areas a physician on the staff of a teaching hospital should be equipped to study and to teach the medical problems of industry. His staff must include full-time assistants in medicine, chemists, pathologists, statisticians, almoners, and technicians. His equipment must include research grants, pathological and chemical laboratories, animal-houses, a museum and a library. He would investigate all suspected cases of industrial poisoning either admitted direct to his wards or referred to him by common consent. He would conduct researches in his wards and laboratories on the toxicity of the numerous chemical substances introduced into industry. Whenever a new chemical substance is on general principles suspect, it must be tested first on animals and not on the workman. In his work the physician studying industrial medicine would reap the advantages of immediate contact with experimental pathologists, morbid anatomists, pharmacologists, chemists, physiologists, physicists and engineers in the corresponding university departments, as well as with his medical and surgical colleagues. He and his staff would instruct undergraduates in factory welfare, working conditions, toxic hazards, the treatment of accidents, rehabilitation and general sick-absence problems. Not only would he take medical students to factories, but also he would arrange a warm welcome for industrial medical officers wishing to attend postgraduate classes. He would establish a close liaison with local factories, and his department would work in conjunction with that of his surgical colleagues interested in accidents and rehabilitation of the injured workman.

The present-day industrialist knows that doctors in general are ignorant of conditions in industry. Too often he regards with contempt and annoyance the efforts of the medical profession to certify illness in his employees. The factory doctor is usually relegated to his ambulance room: the management does not think of him as a trained professional man to be employed in a preventive capacity. No doubt this explains why industrial firms so often aim at conditions which are just tolerable, instead of setting out to design a factory with the idea that it would be a joy to work in. The industrial doctor of the future must be so well trained that he will be invited to coöperate with managers, workers, engineers, chemists and architects. He should aim at discovering all possible faults in the working environment with a view to finding proper remedies for them. One of his tasks must be to apply the discoveries of the research-worker. He should have an aptitude for administration, though in the factory he is best employed in an advisory, not an executive, capacity. He should be responsible to the managing director, and not to any other official of the company, such as the labour manager. He should take charge of all first-aid, medical and nursing services. He should have had considerable experience in clinical work, should know something of social problems and should be able to undertake original research. He should hold one of the

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higher qualifications in medicine, such as MD or MRCP, because his work demands the mind of a physician rather than that of a surgeon or a public health official.

The factory medical officer, said Dr. Hunter in conclusion, must never allow his special technical knowledge to assume greater importance than his knowledge of doctoring in general. He should strive to be a good doctor in the broadest sense of the term, to preserve contacts with academic medicine, to cultivate interests outside his profession, and to follow his various activities with a constant regard for social values. As social-mindedness develops, people are demanding a better industrial medical service. At present the supply of competent doctors is inadequate to fill the vast number of posts which already exists in factories. Meanwhile the majority of our medical schools and teaching hospitals still fail to show that they are alive to this need. A change of attitude is long overdue.

The PRESIDENT thought the lesson was that the medical profession must go into the factories and workshops and see the employees at work.—Sir HENRY TIDY declared that if he was starting a career again he would be persuaded to take up industrial medicine. He agreed that this country is not behind other countries, but the present position of industrial medicine is due to the enthusiasm of very few men.—Dr. H. JOULES also believed that teaching should be carried out in factories; the Middlesex County Medical Society has held such meetings so as to be aware of the working conditions. To understand what is happening to about 90% of the population, we must go to the factories, and we must teach students what we find there.

Dr. DONALD STEWART said the industrial medical officer should spend most of his time about the works and as little as possible in his ambulance room. Mr. Bevin tells us that 22½ million are employed whole-time on national service. Probably two-thirds or three-quarters of these work in factories; three-quarters of a million work in mines and half a million work on the railways. Certificates are given by hospital doctors and general practitioners to the effect that the patient is fit for work, but lack of knowledge of the man's occupation makes this almost malpraxis. Dr. Stewart held that certificates must be given at the place of work. Before starting work all potential employees should be examined so that their capacity may be assessed, and there must be an adequate follow-up of each worker. Industrial medicine wants the best clinical brains it can get.

Dr. D. C. NORRIS spoke of the need for adequate rehabilitation. Queen Elizabeth's Training College for the Disabled has, he said, placed in employment nearly 1000 men with major physical defects; employers are encouraged to visit the college and explain their special requirements, while representatives of the college, and selected trainees, attend employers' conferences and demonstrate the methods and results of training. Nothing but long experience and careful observation will enable the industrial medical officer to assess the probable effects of various physical handicaps on working capacity.

Reviews of Books

Sting-fish and Seafarer

H. MUIR EVANS, MD LOND, FRCS. (Faber. Pp. 180. 15*s*.)

IN this pleasantly written book even the technical parts—for the author is already well known for his work on the brains of fishes—have a sailor's simplicity and frankness; and turning from this to: "These astronomical computations must be accepted with the aquiescence usually attributed to authoritative asseverations" the reader seems to hear a burst of laughter from a crowded cabin. Dr. Evans writes of the electric organs of fish, fossil fin spines, venomous fish of Malaya, treatment of stings by weever, stingray, spurdog, jellyfish and chimæras. In fact this book should be in every ship's library; yet perhaps it will not be loved best for its usefulness, for here is a song of the sea, the surge and the tang of it, the tumble of waves; each page bears a balm from the beach, or a whiff from the deck of a bawley or from cabins of small craft; here sounds the swish of the wake, the gulls and their crying, the moan of the wind in the rigging, and when we snug down in our bunks—or perhaps armchairs by the fireside—the lilt of the tide round the cable.

Manual of Oxygen Therapy Techniques

ALBERT H. ANDREWS, Jr., MD, director of the oxygen therapy department, asst. attending otolaryngologist to St. Luke's Hospital, Chicago. (Year Book Publishers; Lewis. Pp. 191. 11*s*.)

THE possibility of gas warfare has been largely responsible for increased interest in oxygen therapy during the past 4 years. Methods of administration have improved greatly but at the same time have become more complicated and in many hospitals in this country confusion has arisen from the variety of types of equipment which has been issued. There are at least three varieties of BLB mask in use and other masks have also been recommended. A concise handbook which describes the methods and practical details of oxygen administration should have a considerable demand. Unfortunately much of the technical detail in Dr. Andrews's book is not applicable to equipment manufactured in this country, so that some of the sections need revising if the manual is to meet a general need. The spectacle-frame carrier is not mentioned; and in Great Britain it would be unorthodox, to say the least, to recommend that the nasal catheter should be inserted until the patient swallows oxygen and then withdrawn for half an inch. The manual will be useful to those who have made oxygen therapy a special interest, but it cannot be recommended in this country to those who are unfamiliar with the various types of equipment in common use.

Neuromuscular Maturation of the Human Infant

MYRTLE B. MCGRAW. (Oxford University Press. Pp. 140. 13*s*. 6*d*.)

A DECADE of painstaking American research, carried out at Frederick Tilney's instance, is here reported. Minute observation of the behaviour of infants at each stage of their development has permitted theoretical conclusions about the relationship of neural to psychological maturation. Whereas the behaviour patterns of the newborn child are mediated by the subcortical nuclei, neuromuscular functions come to be controlled by the cerebral cortex, as it develops, and this is manifested by the suppression or diminution of certain activities and the emergence and integration of others. The data on which these interpretations are based are derived from study of the startle reflex, suspension time, postural adjustment to being held upside down, swimming movements, prone progression, rolling over, sitting up, and walking. Investigations of grasping, looking and other sensorimotor responses are also described. Valuable suggestions are made about educational procedure, and the futility of attempting to train a child in a given function until it has reached the appropriate stage of neural development is pointed out: this is illustrated by observations on bladder-control. The work is a solid contribution to our knowledge of human development.

Pioneers of Pediatrics

ABRAHAM LEVINSON, BS, MD, assistant professor of pediatrics, North-western University; professor of pediatrics, Cook County Graduate School of Medicine. (Froben Press. Pp. 119. $2.)

THE historical study of the diseases of children has of late years received a great deal of attention. The most prominent figure in this development was certainly the late John Ruhrah of Baltimore, to whom Professor Levinson pays so just a tribute. He brought to his task not merely an unlimited enthusiasm, but a mind singularly well-equipped both on the literary and artistic sides and his work still remains unapproachable even by our more recent historian George Frederic Still. The brochure before us is learned, comprehensive and well-documented without laying claim to be more than a working index, with a good bibliography, worthy of a place on the reference shelves.

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THE LANCET

LONDON: SATURDAY, FEBRUARY 5, 1944

CONTROL OF PERTUSSIS

WHOOPING-COUGH, or pertussis, to give it its earlier and more appropriate name (for the whoop comes late or not at all), is now on the priority list of preventive medicine. In the small sheltered family it may seem no worse than tedious and distressing, but mothers of large broods, and medical men in the poorer parts of our industrial towns, particularly where the climate is harsh, have long learned to dread the disease. Among children under five years it ranks third to the pneumonias and non-specific enteritis as a killing infection and in Scotland more children die of it than of diphtheria. About a tenth of the cases and half the deaths occur in the first year of life. As serious as the mortality figures is the high incidence of crippling complications, immediate and remote, among the victims of this protracted infection—bronchitis and bronchopneumonia, lung collapse, bronchiectasis and tuberculosis. A reduction in both the morbidity and mortality of pertussis is therefore a prime necessity. It may be attempted along two lines of attack—prophylactic vaccination and early diagnosis.

The effectiveness of pertussis vaccine in protecting children against the disease probably depends on a number of factors, such as smooth-phase strains of proved antigenicity, adequate dosage, slow absorption and proper spacing of the injections. A variety of tests for assessing these factors individually or in combination have been used. Thus DAUGHTRY-DENMARK,[1] using the complement-fixation and agglutination reactions, concluded that as small a total dosage as 1·5 c.cm. of alum-precipitated vaccine of 40,000 million organisms per c.cm. gave as good protection as 14 c.cm. of a straight vaccine containing 10,000 million organisms per c.cm. MISHULOW and her colleagues[2] prefer the mouse-protective test to in-vitro reactions as an index of immunity, while FLOSDORF and others[3] have described a new skin test using purified pertussis agglutinogen, which in their experience distinguished the susceptibles from the immunes. The other much more difficult but essential method of estimating the value of prophylactic vaccination is the controlled field trial. Among the best known of these are the studies of PEARL KENRICK[4] and her fellow-workers at Grand Rapids. In three successive trials on an extensive scale she has shown that (1) plain pertussis vaccine in a total dosage of 70,000 million organisms in three weekly injections, (2) alum-precipitated vaccine in three doses of 10,000 million organisms at intervals of 1, 2 and 5 weeks, and (3) a similar vaccine similarly spaced but combined with diphtheria toxoid—all resulted in a much lower incidence of pertussis, with a higher proportion of mild cases among the inoculated compared with untreated controls of similar age and status. The families in the treated series however were on the average smaller than in the control groups, which meant less opportunity for intimate exposure. When household exposures were analysed it appeared that 30–36% of the vaccinated children and 92% of the unvaccinated became infected. This factor of intimate exposure together with inadequate dosage of a straight vaccine may explain the negative results obtained by MCFARLAN and TOPLEY[5] in a nursery where 12 children, given two doses of a 20,000 million organisms vaccine with 4 weeks between, all developed pertussis not different in severity or time of development from the infection among 12 untreated children. An alum-precipitated pertussis and diphtheria toxoid mixture has much to recommend it administratively, and SCHÜTZE[6] has shown that such a mixture in no way interferes with the antigenicity of either reagent; but it must be borne in mind that the age of attack is different in the two infections and that immunisation against pertussis should begin at 3–6 months of age. LAPIN[7] has disposed of one bogy by showing that infants are apparently as immunisable as older children, while BOUSFIELD[8] has raised another in pointing out that a phenolised pertussis vaccine mixed with APT in the syringe may interfere with the antigenicity of the toxoid; he recommends separate injections with separate syringes until this drawback has been overcome. A boosting dose 2 years after the primary inoculation or when the child goes to school should increase resistance and help to minimise the risk of infection being brought from school home to the younger members of the family. It is still too early to say what part pertussis toxin plays in the pathogenesis of the disease. The work of EVANS[9] and others indicates that this heat-labile toxin, liberated by disrupting the organisms by physical methods, has lethal and necrotising properties, and that a protective antitoxin can be prepared experimentally in animals by the injection of toxoid. A specific antitoxin, however, has not been demonstrated in the blood of pertussis patients.[10] A vaccine containing both toxoid and intact bacteria may prove to be the best protecting agent.

Until vaccines are more effective—and more plentiful, for at present demand exceeds supply, partly because of the difficulty of preparation, partly from the greater interest in prophylaxis—more attention should be given to earlier diagnosis. The disease is now generally notifiable, and both doctor and parent should be encouraged to report first cases in a household as early as possible so that measures can be taken to protect other, particularly younger, members of the family. If satisfactory home-nursing is not possible the child should be admitted to hospital, and hospitals must provide more facilities for patients with pertussis, which means not only more beds but more than the average ratio of nurses to patients if these children are to be properly nursed. The child has usually ceased to be infectious by the end of the fourth week, and if otherwise well may be discharged home,

1. Daughtry-Denmark, L. *Amer. J. Dis. Child.* 1942, **63**, 453.
2. Mishulow, L., Siegel, M., Leifer, L. and Berkey, S. R. *Ibid*, 1942, **63**, 875.
3. Flosdorf, E. W., Felton, H. M., Bondi, A. and McGuinness, A. C. *Amer. J. med. Sci.* 1943, **206**, 421.
4. Kendrick, P. L. *Amer. J. Hyg.* 1943, **38**, 193.
5. McFarlan, A. M. and Topley, E. *Mon. Bull. Min. Hlth*, November, 1943, p. 122.
6. Schütze, H. *Lancet*, 1940, ii, 192.
7. Lapin, J. H. *Amer. J. Dis. Child.* 1942, **63**, 225.
8. Bousfield, G. *Med. Off.* Nov. 13, 1943, p. 159.
9. Evans, D. G. *Lancet*, 1942, i, 529.
10. Evans, D. G. and Maitland, H. R. *J. Path. Bact.* 1939, **48**, 465.

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though still whooping. Unfortunately pertussis is clinically a difficult disease to diagnose early, and ancillary laboratory aids become essential. There is some evidence that the characteristic change in the blood-picture occurs early,[11] perhaps even in the incubation period, and a lymphocytosis of 60–80% in a child with a suspicious cough may be good grounds for notification and isolation. The difficulty in the isolation of *H. pertussis* by the cough plate seems to make this method practicable only in hospital, though the Danes have used it in domiciliary practice. On another page CRUICKSHANK reports favourable results with the postnasal swab taken through the mouth and inoculated on Bordet-Gengou medium impregnated with penicillin, which inhibits the growth of other bacteria more than *H. pertussis*. The practitioner could readily use such a method for detecting early cases, and no doubt would gladly do so if laboratory facilities were available. American workers have reported good results, particularly in early cases, from the use of a fine swab on a flexible wire passed through the anterior nares and inoculated on plain Bordet-Gengou medium, but children are more likely to resent this procedure. A satisfactory medium is essential for success, and no doubt improvements could be effected to allow an earlier report than the present three days. A striking feature of the swab culture is the luxuriant growth in many cases, particularly with swabs from young children. This new method of diagnosing pertussis deserves an extended trial, for earlier diagnosis may lead to improved methods of treatment.

ACUTE WAR NEUROSIS

THE pattern of acute war neuroses is much the same whether they arise in civilians,[12] in the Army,[13] or in the British[14] or American Navies[15] or Air Forces. Symptoms include such objective evidence of fear as sweating, tremors, vasomotor instability, restlessness and anxious looks. RAINES and KOLB[15] note that acute war neuroses may develop in subjects who appear stable and well-adjusted before exposure to the precipitating emotional disturbance. Incidence of neuroses and the amount of stress provoking them turn to some extent on the quality of the material. SYMONDS[16] has given an account of the human response to flying stress as seen in RAF personnel. His cases were young men, many in the early twenties, and likely to be both brave and skilled. He states the issue in physiological terms. Inhibition, he suggests, is the basis of acquired fearlessness, and he illustrates the concept from excitation and inhibition in the reflex arc of a spinal or decerebrate animal: "A strong inhibitory stimulus will abolish, a weaker inhibitory stimulus will only diminish, the effect of the same excitatory stimulus." On this analogy he traces the fluctuations during training in the confidence of the average pilot, by constitution neither timid nor fearless. The first time a pilot goes up he probably feels slight fear, soon inhibited by other affects provoked by the event, notably professional keenness. Conditioning by experience also inhibits fear. The first solo flight and the first attempt at aerobatics follow the same course: fear is excited and subsequently inhibited. Crashes, death of friends, narrow escapes during training all excite fear, and every time this happens the inhibitory state for some kinds of fearlessness is weakened; experience reconditions inhibition, but at the same time widens the pilot's knowledge of the things which may go wrong, so that the balance over a long period would gradually tip towards fear. Before that can happen, however, he reaches the operational unit, where he is exposed to new danger from long trips, bad weather and fatigue. When he begins operations there are of course additional risks from the enemy. At first he is protected by the fearlessness of inexperience and by inhibition due to curiosity. This is soon lost, but as the operational tour goes on experience again reinforces confidence; on the other hand it again adds to knowledge of dangers, so anticipation of the next flight becomes a greater strain. Fatigue weakens inhibition, but squadron and crew morale help to maintain it. Towards the end of the tour many factors undermine confidence—anticipation of relief and holidays makes life precious, and fatigue is cumulative. The emotional tension is thus the chief element in flying stress, and the most fatiguing.

Breakdown may turn on different factors in different men as SYMONDS[17] has pointed out in our columns. In the RAF particulars are collected by the neuropsychiatric specialists not only of the man's service, flying hours and duties but of incidents which might be responsible—weight of flying stress (measured by the amount the ordinary man can take), the degree of domestic and personal stress, and the predisposition to functional nervous disorder. SYMONDS[16] quotes three cases in which neuroses developed: one in which abnormal flying and domestic stress were absent and predisposition severe; one in which flying stress was slight, predisposition absent and domestic worries serious; and one in which flying stress was severe, predisposition moderate and domestic stress absent. Naturally all degrees of anxiety are found between the acute neurosis arising in the stable combatant who has experienced great stress and the chronic abnormal fear state seen in the timid, unstable, perhaps backward, man who cannot adjust himself to the change from civilian to Service life.

TORRIE,[18] writing as a psychologist, classes exposure to a direct threat to life as the main precipitating factor. Change from a unit with good leadership to one with a leader who did not inspire confidence was a second important cause of breakdown in his cases. Over 90% of his 2500 patients were timid by nature, nearly half of them were below average in intelligence and education, and a third of them were aged between 30 and 50 years. GARMANY,[19] writing of reactive anxiety in naval ratings, lays chief emphasis on group sense; if this fails as a result of constitutional limitation or traumatic experience, the threshold for anxiety falls and a neurosis develops. Because it is a new thing to speak frankly of fear as part of a combatant's life, euphemistic labels have

11. Gorfinkel, M. *Sth Afr. med. J.* 1941, **15**, 451. See *Lancet*, 1942, i, 176.
12. Sargant, W. *Brit. med. J.* 1942, ii, 574.
13. Sargant, W. and Slater, E. *Lancet*, 1940, ii, 1. Love, H. R. *Med. J. Austr.* 1942, ii, 137; Craigie, H. B. *Brit. med. J.* 1942, ii, 675.
14. Stephenson, G. V. and Cameron, K. *Brit. med. J.* 1943, ii, 603.
15. Raines, G. N. and Kolb, L. C. *U.S. Naval med. Bull.* 1943, **41**, 603.
16. Symonds, C. P. *Brit. med. J.* 1943, ii, 703 and 740.
17. *Lancet*, 1943, ii, 785.
18. Torrie, A, *Ibid*, Jan. 29, p. 139.
19. Garmany, G. *Ibid*, Jan. 1, 1944, p. 7.

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been invented, to avoid casting doubt on his gallantry. Such terms as "combat fatigue" "operational exhaustion" and "flying stress" (used as a diagnosis, not as a description of conditions), like "shell-shock" in the last war, disguise the initial cause, which is in fact failure, however pardonable, to withstand fear. There seems, however, to be no sharp distinction between acute war neuroses and the longer lasting neuroses of peace-time; though being more acutely provoked they respond, perhaps, more readily to direct and simple therapy. Observers may differ in the standpoint from which they view causation, but they seem to agree about treatment. Stripped to the bone their advice to patients is the old maternal dictum "You'll just have to manage." These acute neuroses do not as a rule call for elaborate measures. "Psychocatharsis and analytical methods in general," GARMANY writes, "except in a small minority, serve no useful purpose and indeed constitute a menace and often a disaster." Small errors in management, he notes, will make the difference between recovery and chronicity. TORRIE finds that analysis, if used, must be to the point and not diffuse, and suggests that the same methods of treatment might be applied—presumably in selected cases—to the neurosis of peace-time.

YELLOW FEVER CONTROL

THE eradication of *Aedes ægypti* eliminated yellow fever from urban communities some years ago, but there are still many difficulties in the control of jungle yellow fever because of gaps in our knowledge. The pieces of the puzzle are however being slowly put together. In Brazil in 1938, SHANNON and his colleagues [1] found that certain mosquitoes—*Aedes leucocelaneus*, *Hæmagogus capricorni*, and a species of sabethines—caught in forest regions where yellow fever was endemic were carrying yellow fever virus. More recently, infected hæmagogus mosquitoes have been found living in tree-tops in these forest regions [2]; this probably explains how the infection is carried over from one wet season to another and why the tree-fellers become infected. At the same time, MAHAFFY and his colleagues [3] caught infected *Aedes simpsoni* in the areas of Uganda where they have lately isolated the virus from man for the first time. In both Africa and South America the blood of monkeys from endemic yellow fever zones has been shown to contain immune bodies to the yellow fever virus as measured by the mouse-protection test. The exact part that monkeys play in the maintenance of the disease is unknown, but on many occasions in the past there have been reports of large numbers of deaths among the monkey population just before an outbreak of yellow fever. HUGHES [4] has found that the monkey, *Cercopithecus æthiops centralis* Neuman, one of the most ubiquitous mammals in the East African zone of yellow fever endemicity, may harbour the virus.

Virucidal bodies have been found in the blood of cattle, sheep, dogs, pigs and camels in Africa but they are of doubtful significance as yet, for similar immune bodies have been found in certain domestic animals outside the yellow fever zones. From the Gold Coast, FINDLAY and COCKBURN [5] report yellow fever immune bodies in the serum of one of five rodents called *Thryonomys swinderianus*, in one of four buff-backed herons, one of three African barn-owls and the only Senegal kingfisher examined. Some of these birds are closely associated with man and cattle and have an extensive migratory range. BUGHER [6] has made extensive and intensive studies of the fauna of Colombia in a search for possible carriers, but the only sera having any neutralising antibody were from buzzards, and he doubts the significance of this observation. There must be many factors in common between South America and Africa as regards the means of survival and spread of the disease in the endemic jungle areas, and more intensive studies should be carried out in Africa using the improved protection tests devised by the American workers. [6,7]

Meanwhile, the best means of combating the disease in both continents is mass prophylactic vaccination. The vaccine used by the American and British authorities in Africa, England, South America and the United States is now made in a more or less uniform way and is all derived from the same attenuated parent strain known as 17D. Now that human serum has been eliminated from the vaccine it is presumed that there will be no recurrence of the jaundice which has several times followed the inoculation of certain lots in recent years. The workers in Brazil have had the largest field to work in and have fortunately been able to make large-scale follow-up tests of the production and duration of immunity. It has been found that batches of vaccine made from different substrains of the parent strain may differ in their antigenicity, but most centres now make their vaccines by inoculating embryos with "seed-lots" of virus from a very large batch which has been shown to produce satisfactory immunity. A month after inoculation with a satisfactory vaccine about 95% of the inoculated persons have demonstrable protective antibodies in their serum. FOX and CABRAL [8] have noted in one group tested that 98% of those immune a month after inoculation had immune bodies 4 years later. They found in Brazil [9] that to achieve such results each person should receive at least 500 m.i.d. for mice, and in practice the number of doses per ampoule of vaccine is usually calculated on the basis that each person receives at least 1000 m.i.d. for mice. There is no reaction to the vaccine and almost all Europeans going to West Africa and many of those in East Africa have been immunised. Mass immunisation of natives has also been performed in parts of both coasts. If this policy is persisted with it should gradually affect the incidence of the disease among the native population, as it has done in South America, and it should also lessen the risk of spread from East Africa to India.

1. Shannon, R. C., Whitman, L. and Franca, M. *Science*, 1938, **88**, 110.
2. Rockefeller Foundation Review for 1941.
3. Mahaffy, A. F., Smithburn, K. C., Jacobs, H. R. and Gillett, J. D. *Trans. R. Soc. trop. Med. Hyg.* 1942, **36**, 9.
4. Hughes, T. P. *Ibid*, 1943, **36**, 339.
5. Findlay, G. M. and Cockburn, T. A. *Nature, Lond.* 1943, **152**, 245.
6. Bugher, J. C. *Amer. J. trop. Med.* 1940, **20**, 809.
7. Whitman, L. *Ibid*, 1943, **23**, 17.
8. Fox, J. P. and Cabral, A. S. *Amer. J. Hyg.* 1943, **37**, 93.
9. Fox, J. P., Kossobudzki, S. L. and Da Cunha, J. F. *Ibid*, 1943, **38**, 113.

The manufacturers of 'Trilene' have lately heard of two cases in which serious toxic symptoms have followed its administration with a closed circuit. A full investigation is now being conducted, and they suggest that in the meantime trilene should not be used with a closed circuit.

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Annotations

CYTOLOGIST ON THE GRAND SCALE

Sir JOHN FARMER, FRS, who died last week at Exmouth in his 79th year, had the gift of interpreting Nature and turned it to wide public advantage. As a student of cytology in the laboratory of I. B. Balfour, an inveterate mountaineer, a gardener for whom the daylight was never long enough, he learned the pattern of growth and enjoyed communicating it to students whom he drew into his own bluff enthusiasm. He resuscitated the Chelsea physic garden, he guided research on cotton growing in the West Indies, he helped to safeguard the world supply of timber. At the Imperial College during the last war, when in name he was only director of the biological laboratories, he was bearing the whole burden of day-to-day administration. His learning and insight, his donnish exterior and companionable spirit, leave an indelible picture.

INVESTIGATIONS ON ANTISEPTICS

OF late years much attention has been paid to the toxic effect of antiseptics on the tissues, for when they are applied to wounds this is quite as important as their bactericidal power. A useful investigation is described by Herrell and Heilman [1] who compared the toxic effect of antiseptics, which they exert on the migration of cells in tissue culture, with their antibacterial potency against pneumococci, staphylococci and streptococci. Penicillin was more actively bacteriostatic and less toxic to the cells than any of the other compounds studied. Gramicidin, another mould product, was not very toxic for the tissues and was quite active against streptococci and pneumococci; but it was relatively ineffective against staphylococci. Two detergent antiseptics, 'Zephiran' and 'Phemeride,' were found to possess considerable germicidal activity against all three organisms, combined with a toxicity which was little greater than that of gramicidin; and in our own columns Iland [2] has also reported encouraging results with phemeride. These two compounds are cationic detergents—i.e., the cation or electro-negative part of the molecule is the active portion. Gramicidin behaves in many respects like an anionic detergent. If gramicidin is mixed with a cationic detergent, the antibacterial properties of the two compounds are not summated; rather they cancel out. However, gramicidin can safely be combined with an anionic detergent or with any of the ordinary soaps. Penicillin is not affected in this way. 'Merthiolate,' which was also tested, was found moderately effective as a germicide, but it was much more toxic for the cells than the other compounds discussed.

An ingenious method of studying the action of antiseptics on the growth of epithelial tissue is described by Robson.[3] The vaginal epithelium of mice normally consists of two layers of flat cells, but it can be stimulated to active proliferation by the subcutaneous injection of œstradiol dipropionate. The progress of growth can be determined by taking vaginal smears. If the antiseptics to be tested is applied to the vagina on three consecutive days, starting at the same time as the injection of œstradiol, its effect upon the growth of epithelial cells is easily demonstrated. Examined under these conditions, brilliant-green and gentian-violet considerably inhibited growth, acriflavine and proflavine were less injurious, while various sulphonamides were completely innocuous.

Other workers have tried to discover which vital process of the bacteria is particularly susceptible to the action of the antiseptic. Thus, the oxidative metabolism of bacteria is not affected by sulphonamides in concentrations which effectively inhibit growth, but the new antibacterial compound, propamidine, is more active in this respect. As is well known, the diamidine compounds were first introduced for therapeutic use against sleeping sickness and leishmaniasis by King, Lourie and Yorke [4] in 1938; their antibacterial action was discovered by Fuller [5] in 1942, and the clinical application of propamidine was described by Thrower and Valentine [6] last year. The influence of propamidine on the oxidative systems of *Bact. coli* has now been examined by Bernheim [7] using the standard Warburg technique. Where the oxygen consumption is dependent on peptones or amino-acids (e.g., alanine and asparagine), propamidine in low concentration causes well-marked inhibition after a latent period of ½–1 hour. If carbohydrate products, such as pyruvic acid, are present, inhibition is much less, and if glucose is present the oxygen consumption is not checked at all. In experiments on the growth of *Bact. coli* and of *Staph. aureus*, Kohn [8] finds that the bacteriostatic action of propamidine is only slightly diminished by the presence of proteoses, in contrast to the great inhibition of the action of sulphonamides which these compounds exert. Apparently propamidine interferes with the nitrogenous metabolism of bacteria rather than with their utilisation of carbohydrate.

PETHIDINE ADDICTION

IT has been known for some time [9] that pethidine can produce addiction even to the extent of physical dependence, and further observations have confirmed this. Hecht, Noth and Yonkman [10] found that after intramuscular administration of 0·1 gramme six to eight times daily for periods exceeding a month, sudden withdrawal occasionally resulted in nausea, violent vomiting and profuse perspiration. These symptoms began a few hours after the drug had been withdrawn and lasted as a rule for one or two days. They could easily be stopped by giving barbiturates and scopolamine. Symptoms of this kind were never observed after long-continued administration by mouth. Himmelsbach [11] has compared the liabilities of pethidine and morphine to produce addiction, working with morphine post-addicts. He concludes that, though pethidine possesses a lower addiction liability than morphine, the difference is largely in degree and not in kind. Hence, it is important to look on pethidine as a habit-forming drug and to apply to it the caution and restrictions which are usual with morphine.

CORTICOTROPHIN

THE evidence for corticotrophic activity in anterior pituitary extracts is well established. The adrenal cortex degenerates after hypophysectomy, and the atrophy can be prevented or the atrophied organ restored to normal or even further enlarged by injecting the appropriate pituitary extract. Then again, those observers [12] who not unexpectedly find that adrenalectomised animals are much more susceptible than intact ones to procedures liable to produce shock also find that injections of corticotrophin decrease this hypersensitivity or decrease that of intact rats. How pure were the extracts used in these experiments is a mystery to outsiders and probably to the experimenters themselves. The fact that so few of the anterior pituitary factors have been obtained in a pure state makes the mode of activity of any pituitary extract a matter of fascinating controversy to the endocrinologist. Thus corticotrophin

1. Herrell, W. E. and Heilman, D. *Amer. J. med. Sci.* 1943, **206**, 221.
2. Iland, C. N. *Lancet*. Jan. 8, 1943, p. 49.
3. Robson, J. M. *J. Physiol.* 1943, **102**, 7P.
4. King, H., Lourie, E. M. and Yorke, W. *Ann. trop. Med. Parasitol.* 1938, **32**, 177.
5. Fuller, A. T. *Biochem. J.* 1942, **36**, 548.
6. Thrower, W. R. and Valentine, F. C. O. *Lancet*, 1943, i, 133.
7. Bernheim, F. *Science*, 1943, **98**, 223.
8. Kohn, H. I. *Ibid*, 1943, **98**, 224.
9. See *Lancet*, 1943, ii, 330.
10. Hecht, H., Noth, P. H. and Yonkman, F. F. *J. Amer. med. Ass.* 1943, **121**, 1307.
11. Himmelsbach, C. K. *J. Pharmacol.* 1943, **79**, 5.
12. Noble, R. L. and Collip, J. B. *Quart. J. exp. Physiol.* 1942, **31**, 201. Reiss, M., McLeod, L. D. and Golla, Y. M. L. *J. Endocrinol.* 1943, **3**, 292.

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has been postulated as being responsible for all or part of the growth-promoting activity, glycotropic activity and diabetogenic activity of anterior pituitary extracts, and what is more there is evidence to support all these claims, though not evidence enough to make them by any means cast-iron. A recent and unexpected claim by Tyslowitz[13] may help to clarify the issue. He finds that corticotrophic activity of anterior pituitary extracts is capable of dialysing through a 'Cellophane' membrane. This suggests that the corticotrophin molecule is much smaller than those of the other pituitary factors. If this claim is substantiated it will presumably be easy to obtain preparations of corticotrophin free from any of the other anterior pituitary activities. Unfortunately the dialysis or ultrafiltration process appears to be slow, and it remains to be seen that all the corticotrophin present in anterior pituitary extracts can be removed from the extract by this means. If not, then proponents of corticotrophin will still be able to claim that it is responsible for many of the other effects of pituitary extracts. However, the isolation of corticotrophin itself should make for progress in the understanding of its mode of action. Tyslowitz himself finds his ultrafiltrate free from gonadotrophin and thyrotrophin, and he presents evidence that the corticotrophin passing through the membrane is the same as that in the original crude extract, and is not an active prosthetic group broken off in the extraction process.

ELECTROCARDIOGRAM IN PNEUMONITIS

WHEN circulatory failure occurs in lobar pneumonia it is much more likely to be peripheral than central, yet another example of the unexplained immunity which the heart enjoys in many infections. The question arises whether the heart is equally immune in the disease or diseases known variously as pneumonitis or atypical pneumonia. Fuller and Quinlan,[14] reporting their findings in one case in which serial electrocardiograms were taken, found elevation of the ST segment, sometimes of the cove-plane type, with inversion of the T wave. These changes synchronised with fresh exacerbations of the disease, of which their patient had five, and disappeared when the pulmonary infection cleared. They attribute them to the presence of pericarditis, of which, they are careful to point out, there was no clinical evidence, though there was some radiological evidence of cardiac enlargement. On good grounds they exclude coronary occlusion as a cause for the electrocardiographic changes. Care must be exercised in assessing the significance of these findings, even though Fuller and Quinlan have found similar changes in 11 out of 100 cases of atypical pneumonia in which they have carried out routine electrocardiographic examination. In lobar pneumonia the electrocardiographic changes have been fully investigated,[15,16] and in one series[15] RT changes were found in 42 out of 45 cases, but the striking observation was that these occurred during defervescence and not during the height of the illness. In pneumonitis apparently the electrocardiographic changes arise concurrently with the pulmonary changes. The most likely explanation is that they are due to pericardial involvement, and in most cases they are probably transitory and of no clinical significance, as in lobar pneumonia. But in patients where recovery is slow and there is any clinical suggestion of cardiac involvement it would be wise to take electrocardiograms, which might well provide the clue to the real state of affairs. What is required first of all is further evidence as to how common these electrocardiographic changes are, to what extent they can be correlated with clinical findings, and what their prognostic significance may be.

13. Tyslowitz, R. *Science*, 1943, **98**, 225.
14. Fuller, C. C. and Quinlan, J. W. *New Engl. J. Med.* 1943, **229**, 399.
15. Master, A. M., Romanoff, A. and Jaffe, H. *Amer. Heart J.* 1931, **6**, 696.
16. DeGraff, A. C., Travell, J. G. and Yager, J. A. *J. clin. Invest.* 1931, **10**, 633.

PLASMA AS AN ADHESIVE FOR SKIN-GRAFTS

Sano[1] has described a method of sticking skin-grafts into place by the coagulation, between the graft and its bed, of a thin film of the patient's own blood plasma. Before operation, 5 c.cm. of blood is withdrawn into a syringe containing 1 mg. of heparin in 1 c.cm. of Tyrode solution and then spun. The plasma is decanted and the cellular residue disintegrated by thorough shaking with a further small quantity of Tyrode solution. The plasma is painted on the recipient area and the cellular extract on the under (raw) side of the graft. The graft is then put into place and smoothed out; sticking is complete in the minute or two it takes the plasma to clot. Sano says that the fibrin film so formed checks oozing from the bed (a frequent cause of incomplete take in grafts); that it prevents side-slip and makes any form of stitching unnecessary; and, most important, that no pressure need be applied to the graft during the period of its primary union to the bed. Since pressure is often difficult to apply, and since stitches, even if put in with scrupulous care, are bound to cause additional trauma, the "plasma-coagulum" method may prove to be a technical innovation of limited but well-defined value. As yet, however, the record of clinical trial[2] is confined to 10 grafting operations, of which one was a failure and only 4 made use of full-thickness grafts. Sano reads a wider significance than the merely technical into her results, for her media are essentially those of the tissue-cultivator. The cellular extract is said to have growth-promoting power, and the fibrin film to form the ideal medium for fibroblastic growth. But it has yet to be shown that fibroblasts and capillary endothelium need a greater supply of fibrinous ground-substance than they do, in fact, always get; and the statement that fibroblast proliferation begins in vitro within a few hours applies only to embryonic tissue. Likewise, the claim that all fibrin-stuck grafts are vascularised within 48 hr. is hardly sensational. Acceptance of the method depends on whether plasma in this situation makes a truly efficient physiological adhesive; but if plasma in an unstrengthened form is not always adequate, it can always be fortified by dissolving extra quantities of homologous fibrinogen in it.[3] It is also a reasonable presumption that the unstable Tyrode solution can be replaced by Ringer, and that cellular extracts can be dispensed with altogether.[4] Lately, Sano has applied her method to tears in the liver and spleen. After brushing the torn surfaces with the plasma and cell extract she holds them together for 3 min., by which time they are firmly stuck.

1. Sano, M. E. *Amer. J. Surg.* 1943, **61**, 105.
2. *Surg. Gynec. Obstet.* 1943, **77**, 510.
3. Young, J. Z. and Medawar, P. B. *Lancet*, 1940, ii, 126.
4. No such hæmostatic agent was found to be necessary by Bentley and Medawar in unpublished trials on the use of fortified plasma for the same purpose.

CHADWICK LECTURES.—At 2.30 PM, on Tuesday, Feb. 22, Mr. C. E. A. Bedwell will give the first lecture of the spring programme of the Chadwick trust at 26, Portland Place, London, W.1. He will speak on the place of the hospital in the health service. Other lectures will include: Dr. S. A. Henry, medical supervision in industry in peace and war (March 14, 2.30 PM, at the London School of Hygiene and Tropical Medicine, Keppel Street, W.C.1), Mr. W. H. Hobday, FRIBA, sanitary science and the replanning and rebuilding of large cities (April 4, 2.30 PM, 26, Portland Place, W.1); Mr. George Laws, FRSANI, a hundred years of sanitary progress (May 9, 2.30 PM, 90, Buckingham Palace Road, S.W.1); and Mr. B. Barnes, D SC, vegetation and human well-being (June 15, 4 PM, Chelsea Physic Garden, Swan Walk, S.W.3). Further particulars from the secretary of the trust, 204, Abbey House, Westminster, S.W.1.

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Special Articles

SUGGESTIONS ABOUT CANCER

AN announcement by the British Empire Cancer Campaign points out that it has always been one of its most important duties to review new suggestions as to the cause and treatment of cancer. "In the past the conclusions arrived at have not always reached the medical profession. At the present time, when practitioners are seeking enlightenment about cancer it is more than ever important that the medical profession should be able to obtain authoritative information concerning the value of various suggested remedies, and of any theories as to causation. The Campaign, therefore, will be willing to communicate its opinion on any new form of treatment on which it has information."

The Campaign will continue to investigate methods of treatment and theories of causation and is willing to undertake or to promote research into such subjects, provided the following conditions are fulfilled :—

1. That, in the opinion of the appropriate expert committee of the Campaign, such a subject offers any prospect of advancing the solution of the cancer problem.
2. That the fact that a theory or suggested treatment is being investigated by the British Empire Cancer Campaign shall only be disclosed with the consent of the Campaign.
3. That the Campaign reserves to itself the right to publish, in an appropriate manner, the conclusions reached, whether favourable or otherwise.
4. That, in the case of theories concerning causation, all available information shall be furnished by the advocate of the theory on the scientific basis and the experimental data which shall be so detailed that exact repetition of the experiments can be carried out by experts in the field of research concerned.
5. That, in the case of methods of treatment, the precise nature, composition and method of administration of the suggested remedy shall be disclosed and that the evidence shall be collected in accordance with the safeguards as to scientific accuracy which experience has shown to be essential, namely : (*a*) That cases shall be of proved cancer, in so far as proof is practicable, preferably by histological examination. For choice, they should be cases affecting so-called accessible organs—e.g., skin, breast, cervix uteri and mouth. (*b*) That every case treated shall be recorded, whether the result is favourable or otherwise. (*c*) That the clinical records, including "follow-up," shall be as full as possible.
6. That, in the case of a treatment based on experiments, the Campaign reserves to itself the right to confirm the results of such experiments before attempting clinical trials of the remedy.

The Campaign will be happy to arrange for medical men to discuss their hypotheses and experiences with appropriate experts in the field concerned. Its address is 11, Grosvenor Crescent, London, S.W.1.

CANADA

AFTER the last war the University of Toronto inaugurated a diploma course of two years in occupational therapy, the only course of its kind in Canada. Before this war the class was limited to 20 students, but since then the enrolment has doubled. The graduates have been working in sanatoriums and mental hospitals for the most part but some have been attached to hospitals for sick children and to general hospitals. Recently the Royal Canadian Army Medical Corps, recognising an important aspect of rehabilitation, decided to make use of occupational therapy in military hospitals, and 70 therapists were taken on the strength of the RCAMC with the rank of second lieutenant. One of the instructors had held an appointment in Edinburgh where she spent a year in teaching. When war broke out, she and another aide, as they are called, went to Britain where they have done good work with the first Canadian hospital units.

DIPHTHERIA-FREE

The city of Brantford, Ontario, has a population of about 35,000. Its last case of diphtheria was recorded on Nov. 20, 1930. This remarkable record is without parallel in Canadian or any other cities of the same size. It has been achieved by the use of toxoid. Toronto, over twenty times as large, had no cases in 1940 ; but in the next two years had 27 deaths from diphtheria. Yet this figure is a contrast with that of 1929 when there were 1022 cases with 64 deaths. Diphtheria is, as Osler said of typhoid fever, "an index of the sanitary intelligence of the community."

BLOOD DONATIONS

When Madame Chiang Kai-Shek was in Ottawa this year she claimed kinship with Canada by saying "I once had Canadian blood in my veins." Canadian blood is going to the battle fronts of the world in considerable quantities. From Jan. 1 to Oct. 31, 1943, 417,865 blood donations, representing half as many litres, have been contributed in the Red Cross centres of the Dominion. October was the peak month with 60,415 donations and the week of Oct. 25 the record week with 16,297. This blood is now being processed in the Connaught Laboratories of Toronto University which receives it from many centres. It also receives the product of serum-separating centres in the Universities of Montreal and Alberta. Montreal University will soon be equipped to produce dried serum ready for export.

* * *

CAMSI (the Canadian association of medical students and internes) has held its annual convention in Toronto, where Dr. Henry Sigerist, professor of the history of medicine in Johns Hopkins University, spoke to them on medicine in Soviet Russia. Prof. Sigerist is editing a new periodical called *American Review of Soviet Medicine*.

The department of vital statistics has just announced 68,859 live births in Canada in the third quarter of 1942—a rate of 23·5 per 1000 population. The corresponding period in 1941 gave a rate of 22·4. Stillbirths also show improvement having fallen from 25·6 per 1000 births in 1941 to 25·2 in 1942. Deaths for the same periods were 9·1 per 1000 population in 1941 and 8·8 in 1942.

MEDICINE AND THE LAW

Workman Refusing Operation

THE important ruling of the House of Lords on the duties of medical assessors was mentioned lately in this column (Jan. 15, p. 98). The case was Richardson *v.* Redpath Brown & Co., decided last December. It was the successful appeal of a workman against a decision of the Court of Appeal in favour of his employers whereby it was held that his unreasonable refusal to undergo a further surgical operation (to cure a hernia) was the ground of his continuing incapacity and that the award under the Workmen's Compensation Act, based on his total incapacity, ought to be reviewed.

The Lord Chancellor emphasised once again that the question whether a workman is unreasonable in this connexion is not a question whether the best medical opinion thinks the operation advisable and safe, but whether the workman in all the circumstances (including medical advice offered to him against the operation) was unreasonable in so refusing. Lord Simon repeated a sentence from his judgment in Steele *v.* Robert George & Co., delivered in 1942. "It may in some cases be quite reasonable for a man to decide not to undergo an operation if his own doctor advises against it, for it is the conclusion reached by his own doctor which governs his decision much more than the logic by which his doctor has reached the conclusion." It was true, added the Lord Chancellor in Richardson's case, that the question is one of fact to be decided by the judge on the facts and on the evidence ; but the county court judge seemed to have misdirected himself as to what the question of fact was and what were the materials relevant to answer it. The same misunderstanding, it seems, misled the Court of Appeal. The burden of proving the man's unreasonableness was on the employers ; they had produced no evidence to prove the refusal unreasonable. Lord Russell, in a concurring speech, said that the county court judge's decision was merely a statement that the medical assessor advised (*a*) that the workman should have an operation and (*b*) that the operation was not dangerous and would have no effect on the patient's nervous condition ; and a statement that the court

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accepted the assessor's advice. The workman had told the court that his panel doctor advised him against the further operation; the panel doctor was now serving in the Army and was not available as a witness. The county court judge apparently declined to accept this evidence, but, in Lord Russell's view, he had failed to consider the evidence of two eminent specialists Dr. Worster-Drought and Sir Ambrose Woodall, FRCS, who testified that they were definitely against such an operation; they thought it would aggravate the neurosis still persisting from the previous operation for this same hernia.

The county court judge, concluded Lord Russell, had considered only the correctness of the rival medical views and had decided (under the guidance of the assessor) that the view of the employers' expert witnesses prevailed over that of the workman's. So the workman wins his appeal.

The Court's Use of Medical Assessors

To return to the topic of an assessor's functions, the House of Lords has now overthrown a practice which, it was told, has of late years become almost universal in workmen's compensation cases in the county court. In 1913, in Smith *v.* Foster, the Court of Appeal seemed to decide that the medical assessor could examine the workman and communicate his opinion privately to the judge. This proposition, says Lord Simon, is wrong and must be overruled. It will be recalled that in Richardson's case, during the final speech of counsel for the employers, the county court judge intimated that the medical assessor (Dr. W. A. Brend) would like to examine the workman. The examination took place in private. "We have no information," commented Lord Simon, "what passed between the workman and Dr. Brend, but, on the resumption of the hearing, the judge intimated that the medical assessor's opinion was in favour of the operation."

A medical assessor has no statutory authority to examine a workman in a case like this and is under no obligation to disclose his opinion to anyone but the judge. It is true that the judge can summon a medical referee to sit with him (under para. 5 of the first schedule to the 1925 Act); but that fact, in Lord Simon's opinion, "cannot constitute the assessor, however eminent, a sort of witness who cannot be cross-examined and whose testimony may be conveyed in a whisper or at any rate need not be fully stated to the parties."

Study of their lordships' judgments indicates that what Dr. Brend told the judge in private was something neither sensational nor sinister. Their lordships noted that the judge in his award referred to the fact that Richardson had, both in London and in Watford, suffered from bombing. Although counsel contended that this fact had been stated by Richardson himself in his evidence in chief, the item of information was fastened upon as a specimen of the unsworn and private statements which a medical assessor can make to a judge if he be not checked by the legal insistence that courts shall decide upon evidence formally given in public and subjected (if the opposing side desires) to cross-examination. Richardson's employers, it will thus be seen, lost their case on two separate and self-sufficient grounds—first, the county court's use of the medical assessor, and secondly the failure to prove that Richardson was unreasonable.

COURSE ON MENTAL DEFICIENCY.—Provided there are sufficient entries the University Extension and Tutorial Classes Council in coöperation with the Provisional Council for Mental Health will hold their usual course on mental deficiency and allied conditions from April 24 to May 5. The course is intended for medical practitioners, especially school medical officers, certifying officers to local authorities and medical officers in institutions, and this year attention will be paid to the suggestions with reference to ascertainment and its extension to maladjusted children in the new Education Bill. The course will take place at the London School of Hygiene, Keppel Street, W.C.1. Applications should be sent as soon as possible, but in any case before March 18, to Miss Evelyn Fox, c/o University Extension Department, University of London, 39, Queen Anne Street, London, W.1.

ALMONER IN NEW HEALTH SERVICE

THE job of the almoner, said Miss DOROTHY MANCHÉE, is to apply the principles of case work to the whole problem of the hospital patient. She was opening a discussion at the RSM section of state medicine on Jan. 28, with Sir WELDON DALRYMPLE-CHAMPNEYS in the chair. Training for such a job comprises a university course in social science, followed by field work in which the student learns to interview and to keep records. Miss Manchée regards the collection of money from the patient as outside the duties of the almoner. At St. Mary's Hospital, where she works, money is just money and goes in and out through the contributions office where assessments are made. This sets the almoner free for purely social work, and should enable her to take part in the education of medical students in social medicine. Even now various experiments in teaching are being made; in some hospitals students watch almoners at work, in others the almoner joins the ward round and gives the social history of each case. In country districts the almoner might come to act as consultant to several health centres. She would like to see a chief almoner at the Ministry of Health.

Local authorities, said Mr. E. RIDLEY, are required by an old statute of 1603 to collect maintenance from patients and this requires a means test. In Middlesex, where he is director of public assistance, people dislike having to go to the relieving officer before they can get into hospital, so the authority endowed an almoner with the powers of a relieving officer. She may have to recover the cost, or part of it, from the patients. She may have to organise the outpatient department, arrange for care of the home while a wife is in hospital, and advise about convalescence, aftercare and treatment. The unmarried mother and her child will need special attention; the almoner may have to negotiate adoption of the child or find employment for the mother. In some hospitals she has drifted into the position of receiving officer, but this he thinks is undesirable except when she is dealing with maternity cases. If we are to have a comprehensive medical service in which treatment is free, the almoner would no longer have to extract contributions. But Sir William Beveridge thought that hospital patients should make some payment. Mr. Ridley did not see much scope for her services in rehabilitation.

The educational background of almoner and health visitor was compared by Dr. J. A. CHARLES. Most almoners have taken a university course in social work followed by practical experience; most health visitors have had a complete nursing training, with some midwifery, followed by a crowded six months of sanitation, hygiene and social work. In the public health service, where social factors are many and variable, both have their opportunities. He quoted examples from his Newcastle experience.

One woman of 26 with a tuberculous spine and her mother with diabetic gangrene had no source of income except the mother's old-age pension and £1 7*s.* 6*d.* allowed them by her son in the Navy. They were looked after by a sister of 44 who had given up work to mind them. They were short of bedding, and the tuberculous patient had given up attending hospital because they couldn't afford the ambulance charges. Free transport to hospital was arranged, the Royal Naval Benevolent Trust granted £5 for bedding, and the health committee gave a grant towards food and provided a spinal brace.

In a national health service probably as many almoners will be needed outside hospitals as in them, and interchange of workers between the two groups would be good. Almoners should be available for consultation with general practitioners. It might be that a public health nurse of the type developed in America would be more generally useful than almoner and health visitor working side by side.

The OED defines an almoner as "the official distributor of the alms of another." Dr. R. P. GARROW suggested social secretary as a better name. In Hornsey, he said, he was seldom able to do what the almoner wanted. He would get a letter asking him to arrange 6 months convalescence in a heart home, ordered by a doctor for a child. When he saw the child, however, he might find he disagreed; and was often thought uncoöperative in consequence. "Coöperation seems to mean," he said,

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"that I do something you want me to do, whether I think it is sensible or not."

Speaking as secretary to the Institute of Hospital Almoners Miss M. J. ROXBURGH asked how the family was to be guarded in the future against too great an abundance of visitors in the home—a question which Dr. CHARLES answered later by remarking that in country districts housewives seemed to welcome a lot of visitors. But under the new regime he thought the almoner should visit only on the recommendation of the health visitor.—Dr. FRASER BROCKINGTON (Warwick) thought the almoner should stay in hospital. The health visitor *is* a social worker and she has been doing social work for years. If this form of health service was to be expanded he favoured the American idea that the work should be done by one person, perhaps with a rather different training from either. Some medical knowledge she should certainly have, or how could she trace VD contacts?—Dr. PHILIP ELLMAN mentioned the help the almoner has given in long-standing cases of rheumatic illness; there was scope for her help in other crippling diseases, and in tuberculosis.

Returning to Mr. Ridley's view that the almoner had no particular place in rehabilitation, Miss ROXBURGH was sure of her usefulness as a liaison officer at all stages of the patient's recovery. The Ministry of Labour had indeed urged the institute to supply almoners to rehabilitation centres.—Dr. E. W. UNDERWOOD said that almoners, already well established in voluntary hospitals, could be equally successful in large municipal hospitals. Middlesex had welded public assistance to public health, and their system of almoners is a model for other areas. He would welcome a direction from the Ministry of Health to local authorities to make better use of their powers of appointing almoners.

Miss MANCHÉE, replying, said she thought there was little to be gained by changing the name of almoner at this stage.

In England Now

A Running Commentary by Peripatetic Correspondents

OWING to the departure of a colleague to the Forces I have taken on work as medical referee to the Merchant Navy and have to see sailors and decide on their fitness for service. And what a kick one gets out of it! The other night a man came in with auricular fibrillation and rather short of breath; he gave his age as 59 but looked much older. I broke it to him gently that a spell ashore would do him good and he tried to persuade me that there are always light jobs at sea; but I know too much to credit that in war-time. He left sadly, saying that he had hoped to see the war out from the Atlantic. Then there was a man of 45 who ranked as a coal trimmer, a humble post for a man of his age, and I wondered why he had not risen to fireman at least. But as he entered my consulting-room he stumbled against a large and very obvious easy chair and a few minutes later was making wild guesses as to the number of fingers I was holding two feet from his face. When his score was about 25% I put it to him that, if he was torpedoed, he might not be able to find his way to a boat, and he came back with, "That's all right, Sir. I'd just go up on deck and jump overboard; they'd pick me up as they did before!" No wonder that he remained a mere trimmer—a fireman has to see something at his work—and no wonder too, that, as I dragged from him with some difficulty, he had received the BEM. I only wish the head of the German Navy could be in my room for half an hour; he would soon realise that his submarines have no chance of driving our merchant ships off the Seven Seas when they are manned by men like that.

* * *

Although the posters on the railway station implored us to stay "at home this Divali" we decided that as "home" was 6000 miles away we might exempt ourselves from this proscription and see something of India in our fortnight's leave, which coincided only by chance with the Hindu New Year. Perhaps to absolve myself from any remaining scruples of conscience, I chose the hospital padre as the companion of my journey; and together we entered the magnificent environment of time-tables, guides and maps which forms the happy prelude to a holiday. Since the calendar (and that alone) told us that it was winter, we decided to go south; and after weighing up rival claims we plumped for Mysore. On our two days' journey we learned how favourably railway travel in India compares with a war-time journey in Britain. We spent a night in Bangalore, which readers of *My Early Life* will remember as the Indian station of the youthful Churchill; but now it is military and cosmopolitan, and we fled from it to the sanctuary of Mysore City, where we spent a week without seeing khaki, apart from the diversified uniforms of the palace guard. Mysore makes the boast, less ambitious than it may appear, of being the cleanest city in India. There are many modern buildings, and wide well-kept streets, while on the outskirts there are fine boulevards with gardens ablaze with tropical flowers of all colours. To the west of the town is a hospital centre with general hospital, pathological institute and maternity hospital. Even in a progressive native state outpatients have to queue up, but the waiting throng is more colourful than I remember it at home in the Radcliffe, with bright turbans and gay saris. During the time of waiting, the surgical cases do not hesitate to make capital of their deformities in begging, but in India charity is quickly worn out by the iteration of appeals.

When dusk falls, Mysore becomes a city of light; the kingdom of Mysore is rich in hydroelectric power and this has been skilfully used to add a new kind of magnificence to Oriental glamour. By good fortune we saw the royal palace fully illuminated, a rare sight, for the effect is produced not by flood-lighting but by rows of bulbs arranged all along the lines of the building, so that from a distance we saw a fairy palace pricked out in tiny points of light. At Divali, too, the houses are lit up with candles and a line of lights follows the steps which climb Chamundi hill, overhanging the city. As a recovery centre from blackout neurosis Mysore has much to commend it; even though one must take the rough with the smooth—neon signs with illuminated palaces.

Mysore has many crafts—silk weaving, carving in rosewood and pungent sandalwood, and inlaying of ivory: at the Chamarajendra Technical Institute, and in the Jaganmohan Palace, objects are displayed which it would be almost a sin not to covet. At the Zoo, our favourite exhibit was not the home-grown tigers but the exotic *Berkshire pig, habitat Gt. Britain.* There is no forgetting that Mysore is a royal city; palaces crop up in every street, and in default of palaces there are the royal stables, with horses, state-coaches and harness, and even that most ungainly of screen favourites, the elephant "Sabu." It is perhaps as well that outside the city the tombs of a score of maharazas dead and gone remain to preach a "sic transit" sermon in stone.

Nine miles away is Seringapatam, the stronghold of Haidar Ali, the tyrant of Mysore and ravager of the Carnotic; and of his equally cruel but less capable son Tippu Sultan. Tippu's summer palace, gay with arabesque frescoes; his gloomy dungeons; the watergate where he fell in the siege of 1799; and the tomb where he lies at Haidar's side: these epitomise his luxury, his cruelty and his fate. The triple line of stone bastions is now the playground of monkeys and wagtails; but the curious eye can pick out the place where the red-coats swarmed over the river Cauvery, and sealed the breach in six minutes.

Anyone who cares may catch the native bus in Mysore, and travel the hundred miles to Ootacamund in the Nilgiri hills, the "Blue Mountains" of Southern India. When I made the journey I was perturbed at seeing the driver give place at the wheel to the conductor a few miles from Mysore; but as the Indian next me said, "He practises here, where there are no policemen, and in time he will become a driver too." His performance did not make me share this confidence and I was glad when he tired of his dangerous lesson. The road cuts through about twenty miles of jungle, and then zigzags up the hills, climbing 4000 feet in about 10 miles. The plateau on the top is known as the "Downs" and goes some way to deserving the title. Ooty itself lies among evergreen hills. We climbed the highest of these, Dodobetta (8760 feet) one day before breakfast; but the merit of this performance is lessened by our starting off at 7300 feet, and by breakfast in our hostelry being at the accommodating hour of 11.30 AM. From the summit

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we had a magnificent view over miles of hill and jungle-clad plain, and patches of fleecy cloud; and we agreed that even India and the Army have their compensations.

* * *

The son-father relationship is important in human biology. From the son's point of view it may be divided into three stages: (1) dependent-adoration stage during childhood with imitative and protective functions; (2) the break-away, even unto hostility, during puberty and mental puberty with a view to securing individuality and new territory; and (3) a swing back to affection and reverence for things paternal in order to secure family continuity and racial stability. Of the biographies by sons of fathers a few have been written or at any rate fabricated in stage 2—for example, Gosse's *Father and Son*—but the great majority for obvious reasons are written in stage 3, of which the Prime Minister's life of his father is a good and a not too sickly and uncritical example. *Corner Doctor* (Herbert Jenkins. Pp. 160. 15*s*.) is a biography of an old-time New York physician, a sturdy individualist, by Dr. G. W. Vandegrift, his son, although sentences like "The mother's first question after learning the sex of her baby would be whether it had been born with a caul over its face. If so, her happiness was complete. The doctor's labour to get it off in time to save the child from strangulation went unsung" make one turn back and look at his degrees on the cover. Many of the stories are hard to believe, and some of them one seems to have heard before in other contexts. Without doubt this book is the product of stage 3, a literary placenta, which, when swallowed whole after the manner of ruminants, probably promotes a copious and kindly flow of the milk of remembrance.

Parliament

ON THE FLOOR OF THE HOUSE

MEDICUS MP

PARLIAMENT is approaching the problems of international organisation after the war by way of relief and rehabilitation and a world organisation to safeguard all countries against food shortage. UNRRA already stands for relief and rehabilitation. The food organisation arising out of the Hot Springs conferences has not not got as far as a group of initials yet, but it is to be hoped that a shorter name may soon emerge. This approach to international organisation augurs a higher degree of political stability in the postwar world than was attained by the more political approach of the treaties which concluded the last war. Mr. Richard Law speaking on the history and difficulties of UNRRA said that the story began with conferences of the representatives of the United Nations at St. James's Palace in June and September, 1941. As a result of these meetings the Inter-Allied Committee of Post-war Requirements was set up with an Inter-Allied Bureau under the direction of the Government's economic adviser, Sir Frederick Leith-Ross. A survey of the needs of Europe after the war has been made and all the United Nations agreed to meet those needs when their representatives met at Atlantic City last December and formed the executive body of UNRRA. Mr. Law said in 1941 the problem seemed to be the distribution of abundance, in 1944 the problem was the rationing of scarcity.

The important thing is that plans have been made. The United Nations governments have decided to provide the money of administration and the money each is to contribute is assessed as a proportion of the total national income. The administration can be paid for and the money can be found for relief. The difficulty will be in finding the goods to distribute and the personnel which UNRRA will need to send abroad. There is already a demand for doctors with special qualifications as the work is already beginning. The liberated part of Italy is an example of the difficulties we shall meet—food shortage, price dislocations, destruction of water-supplies and sewerage systems, bringing risk of epidemic disease. There is a place for voluntary agencies and at present the Council of British Societies for Relief Abroad under the chairmanship of Sir William Goode is making up teams of men and women. But there will be no great demand for well-meaning amateurs—units are required for water purification, bacteriological examination disinfection, delousing and so forth. As the Minister said, relief work will not be "a kind of Continental holiday for young people from Mayfair." But there is a danger of making too many rules as well as too few, as perhaps there were after 1918, and it is to be hoped that the voluntary societies will be given reasonable freedom of action with what the Americans call their assignment.

Mr. Greenwood laid great stress on the need for avoiding sheer starvation. Before the end of the war there would be "increasing debility, lowered resistance to disease, epidemics of typhus and a growing amount of tuberculosis"—and all of these would be aggravated by the forced migration of many people, probably 20 million in Europe. Relief will pass into rehabilitation with the restocking of pastures, the restarting of agriculture and industry, especially the small industries in rural areas, and it will probably be three or four years before these urgent problems are dealt with.

From the tragic picture of Europe the House passed to the problem of British agriculture and Mr. Hudson partly reassured the farmers. Agriculture after 1918 had a period of depression and the shadow of its possible recurrence after this war has stirred the agricultural community to demand positive assurances of stabilisation of prices and fair dealing. We have not heard the last of agriculture but the House is in no mood to entertain the possibility of another period of depression. A clause giving preference, at the Minister's discretion, to ex-Service personnel was also added to the Disabled Persons (Employment) Bill at the committee stage.

FROM THE PRESS GALLERY

Restrictions on Milk Sales

In the House of Commons on Jan. 25 Colonel Llewellin, Minister of Food, made a statement on Defence Regulation 55G, which has just been published. He said the policy of the Government for the improvement of the quality of the nation's milk-supply was set out in the white-paper published last July. The new regulation prohibited the sale of milk by retail in areas to be specified in orders to be made by the Ministry of Food, unless it was (1) TT milk (and in Scotland certified milk); (2) accredited milk (in Scotland standard milk) derived from a single herd; (3) heat-treated, pasteurised, or sterilised milk. The areas which would be specified were those in which a rationalisation scheme was in force for economising the use of men and vehicles which restricted consumers in the choice of their dairymen. No area would be specified until the Ministry was satisfied that facilities existed for supplying adequate quantities of heat-treated milk to meet the requirements of the area.

QUESTION TIME

Form of Birth Certificates

Sir WILLIAM DAVISON asked the Minister of Health whether the Government had now given further consideration to the question of the form of the birth certificate; and would steps be taken to provide for the issue of a certificate giving only the necessary dates and without additional information as to legitimacy or illegitimacy.—Mr. H. WILLINK replied: I have some sympathy with the view that a certified copy of a birth entry, for the issue of which alone the Births and Deaths Registration Acts provide, is in some respects unsuitable when the sole purpose is proof of age. The only satisfactory alternative appears to be the inclusion of the date of birth in a bearer document serving also as evidence of the holder's identity. Such a solution would, however, depend upon a number of other considerations; and no decision on the subject can at present be reached.

RAMC Administrative Posts

Major CHARLES TAYLOR asked the Secretary of State for War how many members of the medical profession were employed in administrative posts in the Army or on other duties which did not involve the use of their medical skill; and, in view of the shortage of doctors, both in the services and among the civil population, whether he would arrange for administrative posts in the Royal Army Medical Corps to be filled by men who were not doctors.—Sir JAMES GRIGG replied: If the question is taken literally the answer is none. But, in view of the general shortage of doctors a detailed

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investigation has been made of Army medical establishments at home and abroad. Wherever possible officers without medical qualifications have replaced qualified medical officers employed on administrative duties, even in those posts where professional medical knowledge, although not essential, is very useful.—Major TAYLOR: Are there not a number of doctors who rarely if at all use their medical skill and who are doing jobs which are purely administrative in the RAMC?—Sir JAMES GRIGG: If purely routine administrative jobs are meant, I imagine that the medical director in commands or in theatres of war abroad will have to be doctors because their medical knowledge is essential for the proper administration of the medical service.

Home Guard Appeals

Mr. B. V. KIRBY asked the Minister of Labour whether men found fit for service in the Home Guard by a medical board had the right of appeal to any other medical body when from past experience and medical history they knew they were unfitted for Home Guard training and duties, or how else he proposed to deal with the difficulties of these men.—Mr. GEORGE TOMLINSON replied: There is no provision for appeals against the decisions of medical boards. If, however, medical evidence is produced which suggests that there is some room for doubt regarding the correctness of a man's grading, the case is considered by a medical officer of my department, and where appropriate the man is re-examined. Moreover, men directed to enrol in the Home Guard have a statutory right to appeal against the direction to a local appeal board, who, if of opinion that the man should be medically re-examined, must recommend withdrawal of the direction with a view to such re-examination.

Typhus Epidemic in Naples

Replying to a question Sir JAMES GRIGG said: The typhus epidemic in Naples is confined to the civilian population, among whom the incidence has steadily increased since the summer. Control of the epidemic is in the hands of the deputy chief civil affairs officer and the United States typhus commission. Mass disinfestation and the inoculation of key personnel have been organised.

Supplies of Sulphathiazole

Sir LEONARD LYLE asked the Minister of Supply whether he was aware of the difficulty encountered by civilian doctors in urgent cases, especially in rural districts, in obtaining supplies of sulphathiazole; how far this drug was reserved for Army use only; and whether its production and distribution generally could be accelerated.—Mr. CHARLES PEAT replied: I am aware that the demand for this drug, which is of recent development, has exceeded the supply. All possible steps have been, and are being taken, to increase production in order to make adequate supplies available both for civilian and Service use.

INFECTIOUS DISEASE IN ENGLAND AND WALES

WEEK ENDED JAN. 22

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 2110; whooping-cough, 2215; diphtheria, 712; paratyphoid, 2; typhoid, 2; measles (excluding rubella), 661; pneumonia (primary or influenzal), 1122 (last week 1301); puerperal pyrexia, 181; cerebrospinal fever, 70; poliomyelitis, 5; polio-encephalitis, 1; encephalitis lethargica, 1; dysentery, 148; ophthalmia neonatorum, 65. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Jan. 19 was 1842. During the previous week the following cases were admitted: scarlet fever, 147; diphtheria, 33; measles, 35; whooping-cough, 80.

Deaths.—In 126 great towns there were no deaths from enteric fevers or measles, 1 (0) from scarlet fever, 15 (0) from whooping-cough, 10 (0) from diphtheria, 46 (7) from diarrhœa and enteritis under two years, and 143 (16) from influenza. The figures in parentheses are those for London itself.

Manchester had 4 fatal cases of whooping-cough. Manchester and Birmingham each reported 8 deaths from influenza, Liverpool 7, Sheffield 6, no other great town more than 3.

The number of stillbirths notified during the week was 252 (corresponding to a rate of 37 per thousand total births), including 27 in London.

Letters to the Editor

SULPHONAMIDES AND GONORRHŒA

SIR,—The Medical Research Council's War Memorandum No. 10, on the medical use of the sulphonamides, had a generally favourable reception on its appearance last July; but I can no longer refrain from commenting on certain statements in Section ix (Venereal Diseases) which seemed to me fallacious. So many cases have been referred to me by general practitioners who have followed its instructions and have met with unfavourable—sometimes disastrous—results that I now consider it essential that the instructions should be revised.

I append extracts from the instructions with my own comments.

> *Dosage, Adults.*—. . . it is suggested that 5 gm. of sulphathiazole a day be given for 5 days . . . If gonococci are found in smears taken on the fifth day, the remedy should be continued at the rate of 4 gm. a day, for a further 5 days (p. 22).

I have invariably found that, when gonococci persist in the secretions after 5 days of chemotherapy, a continuation of treatment with the same drug, whether with the same, an increased or a diminished dosage, has no effect whatsoever on the disease.

> If a relapse follows the first course of sulphonamide, a second course may be given . . . (p. 23).

A second course with the same drug, even with increased dosage, will not influence a gonococcal infection unless adjuvant treatment consisting of protein shock, mild or severe, has first been administered.

If the second course fails, a close examination should be made for badly draining foci (p. 23).

It is my experience that chemotherapy failures are invariably due to drug resistance and are always accompanied by glandular involvement which may simulate badly draining foci. "Close examination" is not defined, but in practice this can only mean instrumentation and digital rectal examination of the prostate, vesiculæ seminales and Cowper's glands—a proceeding which at this stage in the treatment is almost certain to lead to both local and metastatic complications. Indeed the memorandum itself (p. 23) states that instrumental examination is not advisable before the 6th week.

The paragraph on local treatment (p. 23) is too indefinite. Thus, for example, the reference to irrigations does not state whether these should be anterior or posterior. In my experience such irrigations are not harmful provided they are efficiently carried out, but they are quite unnecessary as a routine measure: they should be prescribed only when there is a diagnosis of drug resistance or residual non-specific urethritis.

> *Tests of cure.*— . . . as suggested in the Ministry of Health Memoranda V. 21 and V. 21*a* should be employed . . . (p. 23).

These memoranda, which were issued before the introduction of chemotherapy, are now out of date. The instructions contained in the report on venereal disease by the American National Research Council are more appropriate, though even these are not ideal. I have found that the diagnosis of failure is easy both during and after chemotherapy, provided that, upon at least one occasion, examination is carried out before the first morning micturition; cultures are unnecessary. It is perhaps wise to take one smear after massage of the prostate, vesiculæ seminales and Cowper's glands, but to repeat the test 4 times at weekly intervals, as directed in the memorandum, is unnecessary and may indeed traumatise the glands and thereby precipitate a non-specific urethritis.

> The final tests for cure should be made not less than 3 months after suspension of treatment, and should include the gonococcal complement-fixation test and a serum test for syphilis (p. 23).

It is now my considered opinion after experience covering a large number of cases that final tests may be safely carried out 14 days after completion of treatment. Of the tests mentioned above the gonococcal complement-

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fixation is useless; the second should always be carried out during the early stages of treatment.

"... *Arthritis* of gonococcal origin often responds very satisfactorily to the systemic treatment outlined for gonorrhœa. . ." (p. 23).

This is sometimes so when chemotherapy has not been prescribed before the onset of arthritis, but where chemotherapy for the primary infection has failed and arthritis has subsequently developed it is rarely of any value, this complication being in itself evidence of drug resistance.

Generally it may be said that treatment with 4 g. of sulphathiazole a day for 5 days effects a cure in 95% of cases of gonorrhœa without adjuvant treatment, and I would emphasise that the failures (5%) are invariably occasioned by drug resistance, associated very rarely with closed foci of infection. It seems desirable that the memorandum should provide information and guidance as to the ætiology and treatment of these 5%.

Wimpole Street, W.1. A. H. HARKNESS.

SULPHONAMIDE DERMATITIS

SIR,—The report on 55 cases of this condition in the Middle East by Tate and Klorfajn is valuable, but we shall do well to reserve judgment as to the magnitude of this risk until data showing the incidence of dermatitis among patients receiving local treatment by sulphonamides are available. Tate and Klorfajn give no such data.

My own experience, derived from burns treated with sulphonamide creams at the Royal Infirmary, Glasgow, suggests that the incidence must be very low, at any rate in the absence of strong sunlight. In a series of more than 2000 burns so treated—all of them for at least 8 days and many for much longer—I can recall no instance of dermatitis of this type. Three cases did occur but the condition was clearly shown by sensitivity tests to be attributable to cetyl trimethyl ammonium bromide rather than to sulphonamides.

LEONARD COLEBROOK.

Burns Unit, Birmingham Accident Hospital.

EFFECT OF THIOURACIL ON WHITE CELLS

SIR,—After reading Professor Himsworth's article of Oct. 16, I tried the effect of thiouracil on two cases of thyrotoxicosis. In both cases the total white-cell count fell to about 2200 per c.mm. with depression of polymorphs. The drug was then discontinued, it being deemed dangerous to carry on. In each case the white-cell count rose to 10,000 per c.mm. five days after discontinuing the drug. Thyroidectomy was performed and both made an uneventful recovery

These cases suggest that the drug should be watched carefully and should only be used where there are facilities for frequent white-cell counts.

B. C. WELSHMAN.

VENTILATION AND TUBERCULOSIS

SIR,—The recent menacing increase of tuberculosis is vaguely attributable to the war, and the danger is apparently to be met by a herculean effort of mass radiography which it is hoped will weed out infective latent cases. The method is no doubt of value, but prevention is better than cure and it needs to be pointed out that a rapidly increasing proportion of the population of London and other large towns lives in flats in rooms of small cubic content in which ventilation has been reduced to a minimum by the suppression, in the interests of building economy, of the open fireplace and the chimney. Such airless boxes must depress health and energy, and multiply the infective potency of any victim of tubercle dwelling in them. In view of the approaching reconstruction of large areas of London the subject has urgent claims to attention. An investigation of the relative rates of tuberculous infection as between house-dwellers and those living in chimneyless flats is needed. For large blocks of flats the place of the chimney can be cheaply taken by air channels leading from each living room or bedroom to the roof level of the building. Such essential air-conditioning is commonly practised by American architects, but the British architectural profession has not yet realised its responsibilities for supplying fresh air to the sleeping citizen. The (optional) open window or the air-brick is no substitute for the suction action of the chimney or air-duct. An advisory committee appointed (in July 1936) by the RCP London to consider domestic heating by gas in relation to health and comfort expressed the opinion that living rooms and bedrooms should be provided with flues, but qualified it with the words "wherever possible." I associate myself with their conclusion that "in the public interest it is highly desirable that this problem should be carefully studied without delay," adding for myself a plea of urgency. I know of recently erected private hospital blocks and nurses' homes in London where neither chimneys nor air ducts have been provided. I also know one block of flats in Mayfair where perfect ventilation has been secured by a British builder using experience and knowledge acquired in the United States. The difference between the fresh lively breathable air of these flats and the dead stale atmosphere of the average small London flat must be experienced to be believed.

London, W.1. W. SAMPSON HANDLEY.

COMMON SENSE IN ANÆSTHETICS

SIR,—

Macintosh and Mushin and Magill have mitigated Mallinson's "modernity."

By indicating that the use of ether does not necessarily signify morbidity followed frequently by Eternity.

Overstatements such as Mallinson's are traditionally useful for making understanding easier.

But it would be a pity if we were quite to lose both Common Sense and Perspective in Modern Anæsthesia.

(*With acknowledgements to Ogden Nash*).

Macintosh and Mushin's criticism of Mallinson's article will reassure many a practitioner who must occasionally give an anæsthetic that ether is still safe and not the cause of such morbidity and mortality as Dr. Mallinson would have us believe.

Mallinson quoted my previous statement (*Proc. R. Soc. Med.* 1943, **36**, 205) that "A careful follow-up of cases. . . . in the Radcliffe Infirmary, Oxford, has failed to show any difference between ether anæsthesia from the Oxford vaporiser and ether anæsthesia by other means," at the end of a paragraph in which he stated that after anæsthetising 18 cases with ether (Oxford vaporiser) the surgeons concerned requested him to desist from using this agent. In this context my statement might well be taken to confirm Mallinson's experience. Such an interpretation would entirely misrepresent my views. Surgeons for whom I have anæsthetised have never asked me not to use ether. This is because the patients' post-operative condition has not been that described by Mallinson following his administrations of ether, and not because these surgeons have not operated under other conditions. In fact, I have successfully used all the methods Dr. Mallinson advocates (though I rarely use general combined with spinal anæsthesia for major abdominal surgery, my custom being to combine general anæsthesia with regional nerve block for such work). Generalised postoperative depression does not occur after ether given by one who knows how to use it judiciously and who does not "push" it to provide deeper anæsthesia than necessary. Further, as Macintosh and Mushin have pointed out, Mallinson is at variance with recognised authorities and with the everyday experience of most anæsthetists in his belief that ether per se leads to serious pulmonary complications.

The doctor who specialises in anæsthesia should be able to use the various modern agents in various combinations to provide safe and elegant anæsthesia, but for the "stop-gap" anæsthetist (and many of them are quite unable to obtain the "few weeks intensive training" which Dr. Mallinson appears to think is so easily come by) ether remains the safest anæsthetic. In fact, it is in this war that ether has really shown its wide usefulness and safety, because anæsthetists are learning to use it well and do not merely "soak" their patients with it. For instance, it is now recognised to be just as essential with ether as with other anæsthetics to give far smaller doses to shocked than to robust patients. A criticism that induction of ether anæsthesia is unpleasant is no longer valid, for ether need not be used for induction, which can be made as pleasant as even Dr. Mallinson could wish by a small dose of 'Pentothal.'

If I were to be anæsthetised, I should when possible

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choose my anæsthetist rather than my anæsthetic and leave the choice of method to him. If, however, the anæsthetist had to be a relatively inexperienced colleague, I would have least qualms if I knew he was to give me ether. Anyone can achieve anæsthesia with, for example, pentothal or cyclopropane, but the refinement of maintaining life as well as unconsciousness is not easy for the novice, especially in seriously ill patients. He can learn proficiency-with-safety most easily, surely and rapidly by learning how to use ether well.

FREDA B. BANNISTER.

SIR,—It was a pleasure to read Dr. Elam's excellent letter. How long have we waited for authoritative comment on the dangers of 'Pentothal' in inexperienced hands! It may be admitted that "chloroform is too dangerous for general use," but nevertheless by the experienced it is still used in the right place with satisfactory results, perhaps because of the over-present consciousness that an anæsthetic which requires judgment is being used—not so with pentothal. One of the factors which has led many "occasional anæsthetists" to consider the dangers of pentothal lightly is that in the Services large stocks are carried and broadcast without comment, which to the inexperienced might suggest it was presented with a special blessing for use on every occasion.

If one delves into the literature to learn those points in the administration of pentothal which are soon acquired by unpleasant experience, how much will one fail to find? For example, much searching will be required to find notes on the association of preoperative atropine and pentothal tremors. When we consider major operations under continuous pentothal, the same sense of proportion is required that one would apply to major surgery under gas and oxygen. All are aware that the latter may be succcessfully employed by the technique of secondary saturation, but we do not find the majority of anæsthetists stressing what is possible as opposed to what it is wise to do. As with all anæsthetics, good results may be obtained by the full-time professional anæsthetist with methods which may not be suitable as a teaching principle for all and sundry.

Experience of several hundred cases, using the Oxford vaporiser in a hospital ship, demonstrated clearly the immense benefit obtained by the lack of delay in recovery with the very light ether anæsthesia which can be maintained. The advantages of the vaporiser are particularly striking in a ship, where gas and oxygen cylinders may from time to time be in short supply. Chest complications were absent, and the incidence of postanæsthetic vomiting was low. The reason may be that with a constant flow of gases, using a standard Boyle pattern apparatus, concentration may vary from 6 to 18% according to the temperature of the element surrounding the ether container, whereas the vaporiser gives a controlled percentage at agreeable temperature.

ERIC ASHMAN.

SIR,—The correspondence which has followed Dr. Mallinson's article has resulted in two basic facts being generally agreed:

That modern anæsthetics are pleasanter and safer than previous techniques, provided the anæsthetist is competent and fully conversant with the methods.

That in the hands of the occasional anæsthetist ether is relatively safer than modern methods with which he is not familiar.

I would submit then that the occasional anæsthetist has no more place in modern medicine than has the occasional surgeon (now fortunately a rarity) except in the case of certain emergencies or minor procedures. One has often seen the farce of a first-class surgeon operating in a nursing-home with a GP administering the anæsthetic (open ether), this state of affairs having arisen because the GP has to earn his living and is naturally interested in the fee. In hospitals, particularly municipal institutions, one has seen a thoroughly competent surgeon operating on a dangerously ill acute emergency with a very junior house-officer in charge of the anæsthetic, he being the first to admit that he has practically no knowledge of anæsthetics and is often scared out of his wits. Few hospital authorities would allow operations to be done by junior medical officers unsupervised, and it is hardly logical to allow anæsthetics to be administered by them. Surely the public should not continue to be inflicted with unpleasant and more dangerous agents, when better methods are known but unavailable because there are not enough competent anæsthetists to administer them.

Leatherhead. D. G. ALLEN.

TOXIC REACTIONS TO SODIUM DEHYDROCHOLATE

SIR,—Sodium dehydrocholate as a 20% solution for intravenous injection is extensively used for determining circulation time. This is described as one of the standard methods by almost all writers on the subject, and has been sufficiently long in use to be recommended in such standard works as Fishberg's *Heart Failure* (1940), Paul White's *Heart Disease* (1937) and Samson Wright's *Applied Physiology* (1940). I have found no reference in these works to toxic reactions, nor is there any mention of it in Martindale's *Extra Pharmacopœia* (1941). The technique has been used freely in this clinic during the last three or four years as a measure of arm to tongue circulation in congestive failure, when it has proved a useful indication of progress under treatment, and also in the diagnosis of communications between the right and left side of the heart. Recently, however, using the standard preparation supplied by a firm whose standards of purity are very high, reactions have been experienced in three patients, and in one of these subsequent death was probably to be ascribed to the reaction. The symptoms were as follows.

No immediate effect beyond the desired bitter taste was produced, and the patient complained of nothing for about an hour. There was then a slight rigor followed by headache, nausea, actual vomiting in one case, and a feeling of severe malaise. No alteration in heart rate or rhythm or fall in blood-pressure was observed in the two non-fatal cases; in one of these the reaction was only distinctly unpleasant, in the other slightly alarming. In the third case, however, there appeared to be an immediate "collapse," and the nurse who witnessed it could temporarily not feel the radial pulse. By the time the house-physician made his observations (10 to 20 minutes later), the heart rate and rhythm seemed undisturbed, and blood-pressure was 150/90 mm. Hg. having previously been 170/110 mm. The patient was still distressed with rather rapid respiration, and was spitting up a slightly frothy sputum, but not in any large quantities. The sputum was not blood-tinged. A few crepitations were heard at the bases, but these had been observed the day before when the patient had been admitted. An injection of nikethamide had been given at the onset of these symptoms, and oxygen was administered. The patient was then left by the house-physician with no great anxiety, but an hour later there was again a sudden circulatory collapse and the patient died in a few minutes. Consent for an autopsy could not be obtained.

I am informed by the suppliers that occasional toxic reactions have been reported by other observers, and that some investigation is being made as to the cause, but that such reactions are "infinitely few in comparison with the number of ampoules used for estimation of the circulation time and other purposes." The proportion, however, which the reactions we have experienced here bears to the total number of times we have used sodium dehydrocholate, although small is certainly not infinitely small. Despite the usefulness of the test, it seems inadvisable to use it so long as the possibility of such serious reactions exists. There are other methods, which though perhaps not quite so satisfactory for bedside use can nevertheless take its place.

Royal Inverness Infirmary. D. G. LEYS.

POSTGRADUATE DEGREES

SIR,—No doubt Dr. Rex Fendall is working very hard for the experience he is acquiring, but house-surgeons *have* been known to work hard, even before the war. He may reflect that a house job is the first thing the young Service doctor is looking forward to after the war, if by then he has enough money to take one.

Dr. Fendall instructs "Service MO" to get down to some real hard study. I personally have been trying to do this (not without tangible result) since 1940; and, believe me, the effort (when one can get the books and opportunity) is far greater than anything required during

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either studentship or house job. Does he imagine that many of us are within reach of his or any other hospital? —or that we could often get away from our periods of watching and waiting in order to enjoy the facilities?

Let it be admitted that those of us who volunteered have accepted the risk, in many instances, that it might be equivalent to professional suicide, and we are prepared for the experiences of "Ex-Service MO" when we get back to civil life. I regret to say that few Service doctors I have met are expecting anything else except having to write off their Service time as a dead loss, to the advantage of their less conscientious (but now more competent) contemporaries. There does remain, however, a vague hope that in the end we shall be proved wrong.

DUTY MO.

RESECTION OF ŒSOPHAGUS

SIR,—I must apologise to Mr. Vernon Thompson for unintentionally appearing, as pointed out by Mr. Brock in your issue of Jan. 22, to jump his claim to priority in œsophageal resection, and slip as unobtrusively as possible into second place. At the time my case was published in the *Lancet* the RSM *Proceedings* reporting his case had not appeared. On his point of accuracy, however, I would refer Mr. Brock to my article, which does not say "resection" but "resection with anastomosis." Apart from Mr. Hermon Taylor's brilliant extrathoracic anastomosis, two cases (Mr. Brock's own) were not anastomosed and the third was a carcinoma of the cardia involving the œsophagus.

Guildford. G. H. STEELE.

WOMEN SUICIDES

SIR,—At a recent trial for murder it was said that women rarely commit suicide by shooting themselves in the head, because, it was suggested, of a reluctance to disfigure themselves even at such a time. In your reference to these beliefs (Jan. 15, p. 99) you said that statistics, in support or refutation, would be interesting. From the Registrar-General's returns one can see that it certainly is a fact that women very rarely resort to firearms as a means of committing suicide. In the 5 years preceding the war, 1934–38, the deaths of 17,810 males in England and Wales were recorded as due to suicide; of these, 1152 or 6½% were the results of the use of firearms. In the same period 8523 females killed themselves, and only 46, or just over ½%, used firearms. That dislike of disfigurement is the cause of such a sex difference is, however, open to question. A simpler explanation would surely be that women have much less access to firearms, and even when they have, are as a rule more than a little hazy about handling them efficiently. It is noticeable that in 1934–38 women showed no differential reluctance to jump from high places, a method of suicide which is hardly conducive to the preservation of beauty in death.

One writes somewhat diffidently on this subject because it is said, probably with truth, that the wide advertisement of a method of suicide brings a crop of imitators. There is no statistical material to tell us whether it puts the suicide rate up or merely directs it into different channels.

Great Missenden. A. BRADFORD HILL.

"WHAT I WANT"

SIR,—It is sad to read of the deterioration in your once patriotic peripatetic correspondent who starts the column in your issue of Jan. 22. Most of us who joined a Service early in the war were inspired only by a desire for adventure or hope of "getting in on the ground floor," or were even spurred on by the restricted opportunities in other directions at the time. So far however the war has given us more opportunity to observe the sacrifices of others (I write from an RAF station) than to make any of our own. If this, for us, fortunate state continues, one would expect to find at the end of the war your correspondent more anxious about the ways in which he might still serve his country than about the opportunity it will afford him to cash in on his personality. He expresses no concern as to the facilities that may be available to make good the defects in his medical skill; he demands only that he shall have a good, interesting, hospital job in the district of his choice with freedom to move "at reasonable notice" if he finds he does not like it. His patients alone are to be his critics but he will be annoyed if other doctors earn money more easily than he does.

Fortunately for the medical services now and in the future there are few doctors of value to the community whose interest in their work is sustained by the financial reward accruing directly from it. Fewer still at this stage of the war can think in terms of "reasonable remuneration" for themselves while they see men in all the services facing operational hazards for a third of the salaries they receive, with prospects for the survivors only a fraction of the least fortunate of doctors. If your correspondent must speculate on the terms on which he will serve his country at the end of the war I suggest he starts from Marx's condensation of Christian economics—"Let each give according to his ability and each receive according to his need"—and let him remember that he has already received more protection than he is likely to provide in a lifetime of medical work.

SPERO MELIORA.

THE BLOOD IN TUBERCULOSIS

SIR,—In your notice last week of Gulli Lindh Muller's book, *The Clinical Significance of the Blood in Tuberculosis* you say: "In the estimation of blood sedimentation rate, she agrees with Day in taking the maximum rate of sedimentation and not just measuring the amount of sedimentation in a fixed time." I certainly do hold this view, but would point out that Cutler held it and preached it many years before I did. My own (and pretty exclusive) view is that the logarithm of the maximum velocity is more useful still as an operative measurement.

Mundesley. GEORGE DAY.

PRESERVATIVE IN INSULIN

SIR,—In his letter of Jan. 15 Dr. Bicknell queries the right of the British Insulin Manufacturers to alter the nature of essential medical products without permission from the Government. The manufacturers are obliged to incorporate an antiseptic in insulin in order to comply with the Therapeutic Substances Act Regulations, 1931, in which it is stipulated "When any therapeutic substance is issued in liquid form in containers which are sealed in such a manner that portions of the contents can be withdrawn for use on different occasions, the liquid shall contain a sufficient proportion of some antiseptic to prevent the growth of any organisms which may be accidentally introduced in the process of removing a portion of the contents of the container." The 1936 Addendum to the British Pharmacopœia repealed the instruction to add a preservative, but in the Fourth Addendum, Appendix XVI (6), it is stated, "When the container is sealed so as to permit the withdrawal of successive doses on different occasions, the solution or preparation of the drug contains a suitable bacteriostatic agent in such a concentration as will prevent the growth of micro-organisms."

When preservative-free insulin became unobtainable one of the manufacturers provided insulin solution without cresol on the prescription of a few physicians in this country. The demand was trivial at the outset and has since diminished almost to vanishing point. No requests for preservative-free insulin were received from any of the hospitals in Great Britain.

Dr. Bicknell suggests that patients do not contaminate insulin, but this has not been the experience of the manufacturers, whose decision to discontinue the supply of preservative-free insulin to special prescription was largely due to the serious consequences which followed the contamination of preservative-free insulin by a patient.

The British Insulin Manufacturers have no wish to control the treatment of patients, but they are aware of their responsibility that the insulin which they prepare for general use shall conform to Government requirements, which requirements they believe to have been based on sound evidence.

H. B. LOMAS,
Secretary to the British Insulin Manufacturers: Allen & Hanburys Ltd., Boots Pure Drug Co. Ltd., The British Drug Houses Ltd., Burroughs Wellcome & Co.

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Obituary

JOHN SHIELDS FAIRBAIRN

BM OXFD, FRCS, FRCP, FRCOG

Dr. John Fairbairn, whose death was briefly recorded last week, spent 36 years at St. Thomas's Hospital, first training and then practising as obstetric physician. When he left the hospital his wisdom and experience were placed for another period at the disposal of the Central Midwives Board and in building up the new Royal College. And his retirement to his Scottish home at Lossiemouth, where colleagues and politicians enjoyed his friendship, completed a well-adjusted life.

John Shields Fairbairn was born in 1865 at Bathgate, West Lothian, son of the distinguished scholar Andrew M. Fairbairn, DD, first principal of Mansfield College, Oxford, from whom he inherited his devotion to education. After schooling at Bradford, he entered Magdalen College, obtained a first class in the school of natural science, and qualified in medicine from St. Thomas's in 1895. Later he became BM Oxfd and was admitted in succession to the fellowship of all three royal colleges. His hospital service was a pride and joy to him and was also an inspiration to his junior colleagues. A. J. W. writes: "After trudging stolidly through the first three years of the preclinical curriculum, and eighteen months in the medical and surgical wards, I arrived eventually before Fairbairn. For many of us for the first time we found the teacher we had always sought, and for that matter had expected to find at the onset of our clinical studies. Here was a man who lived for his work, who understood his subject and to whom patients were patients, not individuals who might (or might not) present interesting symptoms and signs. Here we were made to understand the importance of the background to each case and here we received our initiation into what is today termed social medicine. In his teaching rounds in the obstetric ward we were continuously reminded of the preventive aspect. By him we were treated as colleagues, sometimes ignorant colleagues, but woe betide the clerk who neglected his notes or attendances. John never spared himself, and without just excuse would not spare others, to their great advancement. It was due to him that many of us regained a waning enthusiasm for what he termed 'Medicine with a capital M.'"

His other early contacts were equally fruitful. As pathologist to the Chelsea Women's Hospital he had as colleagues Ewen Maclean, Walter Eden, Comyns Berkeley and Victor Bonney, and the group friendship then formed lasted through the years; some of them were among the "Ten Teachers" of the popular textbook on *Midwifery*. At the General Lying-in Hospital he was the moving spirit in the establishment in Camberwell of the first post-certificate school for midwives. Elected FRCP in 1909 he examined students there and for several universities, and it has been testified how human and straightforward he was in finding out what a candidate knew. He was himself widely read, fully informed on any matter which claimed his interest, and a keen debater. At society meetings nothing pleased him more than hearty thrust and parry discussion. His literary style was lucid and illuminating; it appealed equally to the practitioner, the medical student and the midwife, for all of whom he wrote textbooks. In medical administration he was no advocate of easy compliance with the powers that be; his talent of constructive criticism may indeed have sometimes prevented the timely recognition of outstanding public services. His presidency of the Royal College of Obstetricians and Gynæcologists was unclouded. Following Blair Bell's initiation his three years of office revealed him as a man of affairs and quality. Under his guidance the articles and by-laws were revised, the first diplomate examinations held, the library developed and enriched with the Roy-Dobbin collections, the reference committees with the Dominions and India made effective. The silver mace, and his portrait on the College wall will serve as reminders of the smooth adolescence of a new professional body. During his last year of office Fairbairn joined the round cruise to the Melbourne meeting of the BMA, where he received the hon. MD. He was accompanied by his wife Elma, second daughter of J. P. Stewart of Elgin, Morayshire, who was his devoted guide and mainstay in days of high achievement as well as of failing strength.

At Lossiemouth, although his thoughts were never far from his professional work, he was always studying with deep appreciation the glories of the countryside, and ever learning more and more of his hobby, the rock-garden. Here he might be found busy among his plants, "driving the lazy ones on with a stick," and quoting Farrer's observations on this or that Alpine treasure.

WILLIAM WHITEMAN CARLTON TOPLEY

MD CAMB, MSC MANC, FRCP, FRS, KHP

THE death of W. W. C. Topley at 58 years of age is a grave loss. The past decade has taken heavy toll of British pathologists—Kettle, Boycott, Okell, Laidlaw, Scott, Griffith, Hedley Wright—and of these Topley was perhaps the greatest. He had long driven a frail body to the verge of exhaustion. Formerly the long summer vacation, which he delighted to spend in sailing, served to brace him for another year of ceaseless activity; but after war began he took little rest to compensate for increased strain.

John Russell & Sons

Educated at the City of London School and at Cambridge, he qualified in 1909 from St. Thomas's Hospital. He then showed promise of distinction in the clinical field; but before he had gone far he came under the influence of Dudgeon, who diverted him to clinical pathology. During the brief year spent with Dudgeon he acquired a contempt for all that was false and pretentious, and at the same time an urge—often hidden by a self-disparaging manner, to do the best work of which he was capable. In 1910 he became director of the pathological department at Charing Cross Hospital, and during the next few years he carried on a private practice in Harley Street. The European war, however, had hardly begun before he accepted Colonel William Hunter's invitation to accompany him to Serbia, where typhus fever was raging. There he saw, for the first time, the havoc that infectious disease can play in a population suffering from cold and hunger; and there it was that his mind first turned from disease as it affects the individual to disease as it affects the herd. On his return, late in 1915, he began to consider how he could give up clinical pathology and devote himself whole-time to teaching and research. This he accomplished when, in 1918, he induced the hospital and the medical school to establish an institute of pathology. Moved partly by his experience in Serbia, and partly no doubt by the preliminary observations of Danysz on the spread of a natural disease of mice among a herd of normal animals, he conceived the idea of approaching epidemiology from the experimental angle. So quickly did he get to work that early in 1919 he was able to describe first results in the Goulstonian lectures of the Royal College of Physicians. His continued observations in this new field soon attracted attention, and in 1922 he was asked by Manchester to fill the chair of bacteriology left vacant by the death of Sheridan Delépine.

The next five years were among the most fruitful of his life, and it was then that his most individual work was done. With comparatively little teaching and with few committees, he was able to spend most of his time in pure research. Aided by a small group of devoted assistants,

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he set himself to study the factors underlying the spread of epidemic disease in mice. When he left in 1927 to become professor of bacteriology and immunology at the newly formed London School of Hygiene and Tropical Medicine, he had started the academic diploma course in bacteriology, he had delivered the Milroy and the Harben lectures, and he had established experimental epidemiology on a sound footing. The fundamental nature of his work was recognised in 1930 by his election to the Royal Society.

During the twelve years 1927–39 he was caught in an ever-widening maelstrom of activities. While bearing a heavy load of teaching, he was pressing on with his investigations, which assumed bigger and bigger dimensions. His literary work, which included the standard textbook written with G. S. Wilson, and an *Outline of Immunity*, occupied his evenings and his weekends. He was serving on numerous bodies, including the council of the Royal College of Physicians, the Medical Research Council, the council of the Royal Society, and, most time-consuming of all, the animal diseases committee of the Agricultural Research Council. Before Münich he saw the present war coming, and set himself to make sure that, however unprepared we might be in other spheres, we should at least have an organisation of bacteriologists ready and equipped to deal with the major problems of epidemic disease that might arise from air bombardment and indiscriminate evacuation. Mainly at his instance the War Cabinet set up the Emergency Public Health Laboratory Service, and mainly by his persuasion the Medical Research Council agreed to take this new organisation under its wing. During the first 18 months of the war Topley stayed in London, devoting himself ceaselessly to innumerable questions on which his advice and help were required. By the spring of 1941 his own particular creation, the Emergency Public Health Laboratory Service, was well established, and he was content to hand over its further guidance to others. So when the Agricultural Research Council asked him to become its secretary, he felt free to accept its challenge. With the clear-headedness and ruthless determination that were characteristic of him, he severed every tie with human medicine, and started at once to master his new duties. Throwing himself heart and soul into the work of the council, he dispensed with the existing system of committees, and with the help of expert advice, which he always knew where to seek, and of occasional conferences, he adopted the rôle of a beneficent, though exacting, dictator.

Of Topley's many scientific achievements, probably the most important, however, was the introduction of the herd concept into medicine. Not, of course, that he was the first to think in terms of the herd. There had been epidemiologists before him who had made careful and accurate observations on the origin and evolution of epidemics. There had been bacteriologists who had surveyed samples of the community, and immunologists who had recognised the variability of individual animals to a given stimulus. But it was left to him to focus attention on the herd concept, and to compel the exponents of experimental and preventive medicine alike to think of the reaction of the herd as well as of the individual. In the epidemiological field he saw the possibilities of translating observation under uncontrolled conditions to observation under controlled conditions, and thereby made it possible to treat epidemiology as an experimental science. By this means he was able to study the effect of variations in the virulence and infectivity of the invading organism on the severity of different epidemics; of changes in the rate of addition of susceptible immigrants to an infected herd on the height and spacing of the mortality waves; of differences in the distribution of genetic, physiological, and acquired immunity on the fate of individual animals and on the secular progress of infection in the herd; and of active immunisation, whether by natural or artificial means, in bringing a given epidemic to a close. He had not gone far before he understood the necessity of using statistical methods in order to interpret his results. Here he was fortunate in obtaining the ready help of Professor Greenwood, with whom later he was to work as a colleague and succeed in putting some of his earlier qualitative observations on a more exact quantitative basis. Study of the virulence of strains of bacteria made him question the generally accepted criterion of the minimal lethal dose, and forced him to measure the variability of individual animals within a group. His conclusions on this subject were embodied in the Harben lectures of 1926, and though they met with opposition and even ridicule, the essential correctness of his reasoning was recognised by bacteriologists of the younger generation, who now regard the statistical approach to problems of variation as a natural part of their discipline.

Thinking of the herd again, he saw how hard it is to estimate the rôle of a given bacterium in the evolution of an epidemic without knowing its probable distribution throughout the herd. Dudley's observations at Greenwich were showing the importance of latent immunisation in restricting the spread of diphtheria within a school, and they confirmed Topley's growing conviction that, if bacteriology was to be of full service to the community, it must go out into the field and make observations for itself. While still at Manchester he started a survey of the nasopharyngeal flora among a group of volunteers; and he continued this for many years after his return to London. Likewise he induced others to study the frequency distribution of various antibodies in the general population, so as to be able to interpret more precisely the meaning of deviations from the normal in individual patients and contacts. In order that observations by different groups of workers should be comparable with each other, he insisted on the use of a standardised technique. Already, towards the close of the late war, he had carried out a critical analysis of Dreyer's standard method of agglutination; his conclusions still hold good, and the method as modified by him and his co-workers is in general use today. Actuated by the same impulse for field studies, he was instrumental in getting the Medical Research Council to investigate epidemic diseases in schools. In the interim report of the committee, published in 1938, the discussion and conclusions owe much to his critical insight.

Towards the end of his bacteriological career he was increasingly engaged in teamwork. Being convinced from his experimental studies on mice that active immunisation holds the greatest promise of preventing or controlling epidemic infectious disease, and having confirmed the preliminary observations of Arkwright and of Schütze on the specific rôle of the somatic antigen of the mouse-typhoid bacillus in conferring protection against this organism, he began, with his colleague Professor Raistrick, a series of researches whose object was to extract his substance in relatively pure form in the hope that it would then induce a higher degree of immunity than resulted from injection of the whole organism. The somatic polysaccharide antigen was extracted successfully, but the hope that it would prove superior to the older vaccines was not altogether realised. Nevertheless, the mode of attack was sound; and there is little doubt that in due time, both for purposes of antigenic analysis and for active immunisation, it will prove its value.

More and more, as his wisdom grew, he was sought after for delivering lectures and addresses. Among these, two of the most interesting were his addresses to the Cambridge University Medical Society in 1935, in which he put forward the plea for a modified and shortened medical curriculum for those who want to be clinical investigators rather than practitioners, and his Linacre lecture of 1940, in which he followed Claude Bernard in demolishing the artificial distinction between art and science in medicine, showing that the essence of both is scientific empiricism, and concluding that the really great scientist is always a great artist.

He himself had so many sides to his character, and so many interests, that no one friend could know them all. In some ways he was unusually simple, in others bewilderingly complex. The key to his life and work was an intense devotion to science, and anything less than scientific integrity elicited a scorn that was seldom masked. He knew that more faith is required of the agnostic than of the simple believer in an authoritarian creed; and he might have agreed with Aldous Huxley in saying: "All science is based upon an act of faith—faith in the validity of the mind's logical processes, faith in the ultimate explicability of the world, faith that the laws of thought are the laws of things." Though he never spoke about his duty, once he was convinced that

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something had to be done, he spared neither himself nor others till it was accomplished. He came of the breed of the Shaftesburys, the Wilberforces, and the Nightingales; he took upon himself burdens that he knew no-one else would bear; and by sheer force of personality, by dogged persistence, by charm of manner to some, and by stern dictation to others, he succeeded in reaching his goal. His original mind and shrewd judgment enabled him to launch many different projects in medical education, research, and, more recently, agriculture. He inspired everyone around him, and to the young and pure of heart he gave liberally with an unselfishness often carried to an extreme. His disinterestedness, his desire for the welfare of his juniors, his loyalty, and his humour made him an admirable head of a department. In later years his ability for getting people of diverse training, temperament, and experience to work together as a team was put to many a test, but almost always it emerged triumphant. He excelled as a lecturer and a teacher; in his writings he displayed a lucidity and a lightness of touch which made him always interesting; on committees he had a forceful and convincing manner which few could resist; and in matters of high policy he displayed a foresight rarely at fault. At home, aided by his wife, to whose devotion he owed much, he dispensed a delightful hospitality enhanced by the opportunity it gave for an almost uninterrupted discussion on scientific problems.

Not only what he did himself, but also what he inspired others to do; not only the changes he wrought in laboratory technique, but also the wider influence he exerted on medical education and research; not only his exposure of cherished fallacies, but also the revolutionary outlook he introduced into experimental medicine—all these combined to make Topley one of the outstanding figures of his generation.

THE LATE MR. WILLWAY

From a hospital with the Central Mediterranean Forces, Lieut.-Colonel W. M. Capper writes:

Even at this distance and at this stage of the war, it brings a great sense of loss to hear of Willway's death. He had the true scientific approach to every problem. To some people his abrupt manner and forthright criticism were distasteful: far otherwise was it to those of us who knew him well. His generosity to those in misfortune was unbounded—he knew the true value of money and only kept it to give away. He would send money anonymously to his hospital patients so that they could go for a holiday. His courage only glowed the brighter as the disabilities of his illness increased. When he found that he could not get into the Army he tried to get to Russia to help the war effort. To those of us who knew him in London and Bristol he bade fair to contribute much to neurosurgery. No stress of pain, no tiredness, no weakness, no fear, could restrain his effort to attain greater knowledge in his specialty.

Dr. JAMES METCALFE MACCALLUM, emeritus professor of ophthalmology in the University of Toronto and a former president of the Medical Council of Canada, died suddenly in his consulting-room on Dec. 3 at the age of 82. Outside medical circles he was known as a connoisseur and collector of Canadian paintings. His son, Dr. F. O. MacCallum of the Wellcome Research Institution, is at present senior bacteriologist in the team investigating infective hepatitis at Cambridge.

FACULTY OF HOMŒOPATHY.—The newly formed Faculty of Homœopathy, under the presidency of Sir John Weir, held its first meeting at the London Homœopathic Hospital on Jan. 21. The faculty replaces the British Homœopathic Society founded in 1843. His Majesty the King sent a congratulatory message. A portrait of Dr. Quinn was presented to the faculty by the president. On Jan. 22 a conference was held on the aims and objects of the faculty.

CHARTERED SOCIETY OF PHYSIOTHERAPY.—The King in council has approved a proposal by the Chartered Society of Massage and Medical Gymnastics to change its name to the Chartered Society of Physiotherapy. The society, founded 40 years ago, now has nearly 14,000 members. In a letter to the *Times* of Jan. 24 Sir Herbert Eason points out that a chartered physiotherapist today is trained not only in massage and gymnastics but also in electrical and all forms of ray therapy.

Notes and News

DR. ROBERTSON'S DILEMMA

"But in what manner the noxious exhalations, which are emitted from swamps . . . operate on the human body to produce fevers, only bare conjectures can be formed. To know, that *arcanum* would certainly be matter of great satisfaction to the curious. . . ."[1]

Dr. Robert Robertson, after this sigh over the riddle of causation concentrated upon treating the remitting fever which at the end of the eighteenth century was ravaging the seamen of His Majesty's ships on foreign service; and to good purpose, for he gave them Peruvian bark. He notes that Lind condemned the dangerous practice of allowing men on foreign service to sleep ashore on the African coast.

"What an abominable place is the island of St. Thomas for men to lie ashore at . . . when out of fifty and odd men, that were ashore only one night, in a house with several large fires few of them escaped without sickness!"

His problem was to get enough of the bark to treat the men adequately. In 1769, aboard the *Weasel*, though he had taken three times the quantity usually put into the medicine chest for foreign service, when they reached Africa, he had not half enough for his 32 bad malaria cases. Mr. Curry, surgeon of the same sloop in 1774, had a similar experience. As it was, Dr. Robertson was treating cases largely at his own expense. He calculated that each of his 32 cases needed 10 oz. of bark, which would have called for 20 lb. in all. Bark cost from 12*s.* 6*d.* to 17*s.* 8*d.* a pound at Apothecaries Hall, "so that 20 lb." Dr. Robertson wrote sadly, "would have stood me in twelve pounds ten shillings, above one fifth of my pay."

Determined that the seamen should not go short of their specific, he made various appeals to the Commissioners for Sick and Hurt and to the Admiralty to supply bark freely to "all His Majesty's ships employed in hot climates . . . after the manner they are supplied with elixir of vitriol or James's Powders." His earlier pleas received no answer, but thanks to the intervention of Captain Collingwood bark—and wine in which to give it—were supplied to the *Pallas* and the *Weasel* at Government expense, and Dr. Robertson's own expenses were repaid.

NEW BOOKS ON BRITISH DOINGS

THE British Council has sponsored a new series of shilling booklets (*Britain Advances*, Pitmans and Longmans) in which many pictures and a simply told tale explain what is going on in various fields of our national life. Thus *First—the Infant* shows how children are cared for while their mothers work; *The Unfit made Fit* gives an account of the latest methods of rehabilitation; *Learning to be Blind* describes the network of services provided for our 80,000 blind citizens. The little books are attractive as well as informative. They have a general kinship with the *Britain in Pictures* series (Collins) and the *British Life and Thought* series (Longmans).

ORTHOPTICS

Mr. G. H. Giles, who is a practising optician on the staff of the London Refraction Hospital, has made a careful study of the principles and practice of orthoptic treatment (*Practice of Orthoptics*. Hammond. 25*s.*). He has much to say on the value to the patient of his own "mental effort," but surely it is waste of time to try to cure amblyopia in the adult by occluding the good eye. On most matters he follows the best teachers and all will agree with him that convergent squint of over 25° will not be cured by training alone.

"A MIXED BAG"

IN this record of an uneventful life (Bradley. Reading. 6*s.*) Mr. W. B. SECRETAN, FRCS, analyses the motives which induced him to write it. Chiefly it was for his own amusement and pleasure in recalling scenes and persons; but that pleasure he has succeeded in conveying to his readers. "Write me" said Abou Ben Adhem to the Recording Angel "as one that loves his fellow men." That feeling is clear in Mr. Secretan's pages and is a sufficient reason for their existence. His recollections take us to schooldays at Bradfield in the earlier days of its history; to Guy's Hospital in the last years of the nineteenth century; then to the East as a ship's surgeon; and finally to Reading and the steadily increasing absorption in his art as a surgeon, interrupted for a time by service in France in the last war. Then came retirement with many hobbies and pleasant pursuits, till like so many of his age he

1. Extract from "Observations on Bark being used as a preventive from sickness on the Coast of Africa," printed in the *Naval Chronicle* 1799, ii, 202.

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has emerged to practise his art again in this second war. As Parson Woodforde's journal has become an essential document for the historian of the Napoleonic period, so Mr. Secretan's recollections may become a valued record of provincial life in a busy profession in the England of the twentieth century.

Royal College of Physicians of London

At a comitia held on Jan. 27 with Lord Moran, the president, in the chair, Dr. B. T. Parsons-Smith was appointed to represent the college on the council of the Queen's Institute of District Nursing and Dr. A. S. Barnes on the court of governors of the University of Birmingham. It was announced that the president was nominating a committee to preside over the revision of the College's *Nomenclature of Diseases* and that arrangements have been made for examinations for the membership to be held in Poona and in Cairo during May and June.

The following having satisfied the censors' board were admitted to the membership:

C. R. Amies, MD LOND.; Joseph Benn, MB LEEDS, surgeon lieut.-commander, RN; Mary E. Eiloart, MB LOND.; J. A. Fisher, MD BELF.; J. H. Gould, MB LOND.; Eric Guttmann, MD MUNICH; D. B. Jelliffe, MB LOND.; T. D. Kellock, MB CAMB.; Zina E. Moncrieff, MB ABERD.; R. T. C. Pratt, BM OXFD; J. C. Prestwich, BM OXFD; D. W. Pugh, DSC, MB LOND., surgeon lieutenant RNVR; H. W. Salmon, MB LOND.; H. T. N. Sears, MB LOND.; James Sharkey, MB LOND.; A. I. Spriggs, BM OXFD; A. W. Taylor, MB LEEDS; J. P. M. Tizard, BM OXFD captain RAMC; and M. D. Young, MB CAMB.

Licences to practise were granted to 133 candidates (110 men and 23 women) who have passed the final examination of the conjoint board and complied with the by-laws of the college. The following are the names of the successful candidates:—

Julius Alterman, C. van Anthony, C. G. Ball, G. H. Bancroft-Livingston, R. E. G. Barnes, J. H. E. Bergin, V. H. Bolton, J. A. P. Bowen, T. J. Brady, Elizabeth T. Brash, L. I. Bromley, H. D. Browne, John Bullough, K. H. Bywater, A. S. Carruthers, J. A. Clarke, I. R. Clout, H. M. T. Coles, J. R. C. Cooper, Margot J. Copland, J. A. N. Corsellis, T. C. Cotton, G. S. Crockett, J. S. Crowther, G. A. N. Davis, Deborah Doniach, Kathleen A. D. Drury, D. R. Duff, Margaret J. Dunn, Raymond Earl, P. M. Edis, A. W. Edridge, Olga M. Elliot, A. B. A. Evans, M. E. Evans, J. M. Fabricius, Winifred J. Ferraby, V. O. Finlayson, J. R. Forsaith, I. H. Fothergill, S. A. M. Garibian, Basil Haigh, L. H. Hamlyn, R. J. Harrison, Gerald Hartridge, Ruth M. Haslam, V. S. Hawkes, S. F. Hewetson, H. F. Hills, Dulcie E. Holden, F. L. Holroyd, J. E. G. Hope Scott, W. R. Horsfall, C. A. Houlder, Elizabeth M. Hugill, A. L. Humphrey, T. M. Humphrey, R. W. L. Hurt, Lois E. Hurter, J. R. Hutchinson, P. E. Jackson, Rosemary Jackson, C. D. T. James, L. F. Jepson, O. G. Jones, Jean L. Kahan, D. E. R. Kelsey, J. C. Lawrie, G. de J. Lee, Sheila D. Lee, A. V. Livingstone, P. S. London, Janos Lorber, P. F. Lucas, M. B. McIlroy, A. G. Mackenzie, I. M. MacLean, N. L. M. MacManus, Ronald Majdalany, A. S. Mallam, J. M. Mallett, J. T. Marcroft, J. K. Morgan, Catherine A. Neill, D. C. J. B. Nixon, A. W. Nurick, A. C. F. Ogilvie, D. H. D. Paine, C. R. Palmer, T. J. S. Patterson, B. W. T. Pender, C. P. Perkins, Dorothy M. Phillips, Mary Pilling, W. E. Prosser, T. A. Quilliam, J. V. Radley, D. H. Rea, D. L. Rees, L. J. Rowley, Helen M. Russell, J. T. Scales, C. L. E. H. Sharp, Edith M. Sharpe, G. N. Shell, Leonard Shenfield, P. D. W. Shepherd, R. N. Sidebotham, B. C. Smith, Y. G. Sofer, P. G. Somerville, Ralph Spielsinger, R. V. Sturton, S. M. Talaat, Alan Taylor, E. H. Taylor, C. G. Teverson, J. M. Thomas, W. E. W. Tilleke, Margaret R. Todd, L. J. Topham, E. J. S. Townsend, E. L. Trickey, Gershon, Trosser, E. C. Turton, Ambrosine B. Vaughan, B. H. Vawdrey, Peter Venables, C. I. Waters, T. K. Whitmore, Dorothy Willoughby, Joan B. Winstanley and P. W. Woodcock.

Diplomas in public health, psychological medicine, and laryngology and otology were granted to the candidates named in the report of the meeting of the Royal College of Surgeons in our issue of Jan. 22, and in anæsthetics to those named in our issue of Dec. 18.

University of Edinburgh

On Jan. 22 the following degrees were conferred:

MD.—T. G. Brown and Christina M. M'Taggart.

MB, ChB.—Peter Aitken, C. A. Barrett,* Ellis Bindman, T. F. Boyle, Donald Cameron, J. A. Campbell, T. I. Crichton, T. G. Crombie, A. W. B. Cunningham, J. N. Dobson, T. E. Donaldson, Kenneth Drummond, W. A. Eggeling, James Elkin, W. H. Elliot, S. J. Evans, J. W. Farquhar, D. H. Forster, G. F. Hawkins, A. G. Henderson, D. W. W. Hendry, J. M. Herd, J. M. Kerr, D. K. Kouyoumdjian, Chong-Eu Lim, J. W. F. Lumsden, H. F. Lyon, R. J. M. M'Cormack,* G. D. M'Donald, A. H. M'Kerrow, R. S. M'Neill, J. H. Macpherson, Donald MacVicar, J. D. Malloch, J. S. Milne, J. F. O. Mitchell, R. G. Mitchell, T. R. Nelson, J. A. Paterson, R. M. Paterson, Philip Pinkerton,* R. R. Pratt, Kenneth Rhaney, I. M. Richardson,* Jessie R. Robinson, G. J. Romanes, R. S. Ross, J. T. R. Russell, Isabella M. Scott, J. H. Scott, B. M. Shiels, E. S. Shoucair, Catherine M. G. Smith, Margaret S. Stevenson, R. C. F. Todman, P. R. Walbaum,* Jean H. Walmsley, Ian Wang, Elizabeth Whalley, W. E. J. Wilson and G. D. Wright.

BSc.—Margaret C. Tait, MB (*in absentia*).

MB, ChB of the Polish School of Medicine.—Mieczyslaw Bockowski, H. A. Maslowski, M. P. Pietrzyk, Karol Rafinski, Emil Valis and Zygmunt Wlodarczyk. * With honours.

University of Liverpool

Dr. W. H. Newton has been appointed to a George Holt chair of physiology in succession to Dr. H. E. Roaf, who is retiring at the end of March.

Dr. Newton, who is 39 years of age, is a doctor of medicine and master of science of Manchester University where, under Prof. H. S. Raper, he held the Platt physiological scholarship and a graduate scholarship and later acted as student assistant demonstrator. After a period as house-physician to Prof. A. Ramsbottom at the Manchester Royal Infirmary, he became Sharpey scholar in Prof. Lovatt Evans's department at University College, London, subsequently holding the posts of lecturer, senior lecturer and reader and receiving the doctorate of science of London University. He has been an examiner in physiology in the faculties of medicine and science at London and Cambridge, and acted for some years as visiting lecturer in physiology to the Chelsea Polytechnic and in applied physiology to St. George's Hospital. Since the outbreak of war he has been acting head of the physiology department at University College, and was from 1939–43 sub-dean of the faculty of medical sciences and tutor to medical students. In 1937–38 he visited the United States as Rockefeller fellow in endocrinology, working in the late Prof. Edgar Allen's department at Yale University and at Wood's Hole, afterwards recording some of his impressions in these columns. At the 50th anniversary of the American Physiological Society at Baltimore in 1938 he represented the Physiological Society, of which he is now, with Dr. G. L. Brown, joint secretary. His experimental work has been chiefly concerned with the physiology of pregnancy. He edited the 5th and 6th editions of Lovatt Evans's *Recent Advances in Physiology* (1936, 1939).

HSA Scholarships for Nurses

To celebrate the twenty-first anniversary of its incorporation the Hospital Saving Association established postgraduate scholarships to be known as the HSA Scholarships for Trained Nurses. The following will be awarded annually for the next four years:

2 scholarships for nurse dietitians	£250 each
4 scholarships for nurse teachers	£200 each
4 scholarships for health visitors	£105 each
12 scholarships for industrial nurses	£65 each
4 scholarships for midwife teachers	£75 each

In future years the association may vary the scholarships in number or in kind. Further particulars from the director in the education department, Royal College of Nursing, 1a, Henrietta Place, London, W.1.

Royal College of Obstetricians and Gynæcologists

At a quarterly meeting of the council held on Jan. 29, with Mr. Eardley Holland, the president, in the chair, the following were elected to the membership: A. P. Bentall, Jean R. Burton-Brown, Agnes E. Cathcart, Audrey I. Freeth, David Friedlander, M. M. Garrey and Eileen D. M. Wilson.

Ophthalmological Society of the United Kingdom

The annual congress is to be held on Friday, March 31, and Saturday, April 1, at 1, Wimpole Street, London, W.1. At the Friday morning session Mr. R. C. Davenport and Squadron-Leader J. H. Doggart will open a discussion on ocular psychoneuroses (excluding miner's nystagmus), and on the Saturday morning Prof. Arnold Sorsby and Dr. C. H. Andrewes, FRS, will speak on virus affections of the eye.

Limb-Fitting at Roehampton

Dr. V. K. Wellington Koo, the Chinese Ambassador, will open the new extension of the limb-fitting centre at Queen Mary's Hospital, Roehampton, on Feb. 22 at 12 noon. Guests will be received at 11.30 AM, and after the ceremony they will be shown a film, with commentary by Mr. Langdale Kelham, followed by a demonstration by patients of the use of artificial limbs. Representatives of the Allied Nations have been invited to the ceremony and will be shown recent developments in limb surgery and prosthetics. A scheme has been prepared to make this surgical and technical skill available to the maimed of other countries.

The Birth-rate

A resolution passed by the council of the Malthusian League on Dec. 18, 1943, refers to the present "agitation for increasing the annual number of births in Great Britain" and to a statement in a Government white-paper (Cmd. 6358) that 700,000 births per annum, being the number annually born at the outbreak of the war, would maintain the present population for ever. Since "no responsible person has advocated an increase of our present population . . . the Malthusian League earnestly requests the Government to take no steps whatever which might lead to the increase of the annual number of births, especially among the poorer sections of the community which are already multiplying very rapidly."

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Medical Honours

The following awards to officers of the medical branch of the RAF have lately been made:

MBE.—Flying-Officer Robert Dunlop, MB BELF.

One afternoon in July, 1943, an aircraft crashed on landing and caught fire. The pilot and a passenger, who were the only occupants, were both thrown out of the cockpit and trapped beneath the wreckage of a wing. Three airmen attempted to rescue them, but all were driven back by the heat. One made another attempt alone and this time succeeded in partially lifting the burning wreckage of the wing and he then dragged the pilot clear. Flying-Officer Dunlop had arrived at the scene of the accident and on being informed that the passenger was still under the wreckage, attempted to release him. Whilst this was being done an explosion occurred but Dunlop continued his rescue efforts and dragged the passenger clear of the aircraft.

George Medal.—Flying-Officer G. H. Dhenin, MB CAMB.

One night in October, 1943, an aircraft, which had sustained damage during an attack against Hanover, crashed near an airfield. The aircraft disintegrated on impact and immediately burst into flames. The rear-gunner was injured and trapped in his crushed turret, being pinned down by the remains of the tail unit and rear of the fuselage. A high explosive bomb was in the blazing wreckage some 10 yards away from the gunner. Flying Officer Dhenin, the station medical officer, hastened to the scene of the accident. Although fully aware that the heat might cause the bomb to detonate at any moment Flying Officer Dhenin worked for over half an hour to relieve the injured airman's pain. Efforts to extricate the gunner were, however, unavailing. A mobile crane was brought to the scene and the mass of wreckage was lifted clear of the ground. Displaying complete disregard for his own safety, Dhenin then crawled under the wreckage and released the trapped airman thereby enabling others helpers to drag him to safety.

MC.—Flight-Lieutenant R. J. L. Ferris, MB BELF.

Mentioned in Despatches.—Group Captains: J. K. R. Landells, A. Harvey and C. J. S. O'Malley; Wing-Commanders: T. J. X. Canton, L. E. A. Dearberg, G. A. M. Knight, J. W. Patrick, C. E. G. Wickham, H. H. S. Brown, E. B. Harvey, R. C. Jackson and J. H. L. Newnham; Squadron-Leaders: W. Hargrave-Wilson, A. L. Knipe, M. L. Maley, A. S. Simpson, D. Turner, J. L. W. Walls, B. J. Bickford, E. R. Brown, I. W. H. R. Cran, C. F. Hamilton-Turner, W. L. Hector, R. N. Houlding, D. A. Ker, H. J. Lillie, P. J. O'Connor, J. E. Smith, D. Stafford-Clark and M. W. L. White. Flight-Lieutenants: T. G. Band, A. J. Chiappa-Sinclair, P. J. Bryce-Curtis, R. C. Dickson, R. E. Glennie, C. M. Liddell, A. D. MacLean, A. F. Pearson, T. Primrose, O. H. Sennett, J. A. Sutton and H. M. Urquhart.

The MC has been awarded to the following RAMC officers for gallant and distinguished services in Italy. Major A. K. Dougall, MB DURH.; Captain D. W. Forgan, MB LPOOL, who has since been killed in action; Captain P. M. L. Gunn, MB EDIN.; and Captain J. W. T. Pretsell, MB EDIN.

When the Coldstream Guards were attacking a hill position in Italy last September, a small joint RAP was set up on the ridge behind. This RAP was worked by Captain FORGAN and another officer attached to the Grenadier Guards. These two doctors worked all that afternoon, and came to the conclusion that owing to the distance of carry for stretcher bearers from the battle area, a forward RAP must be established with the leading company. This RAP was set up and run by Forgan who worked tirelessly throughout the evacuation of wounded under shell-fire for most of the time in almost impossible conditions. His skill in organisation under extreme difficulties undoubtedly saved many lives, and his devotion to duty and calm attention to the wounded under these hazardous conditions was superb.

After the landing of a special raiding squadron at Bagnara last September the unit came under machine-gun and mortar fire from the high ground overlooking the town, suffering severe casualties. Captain GUNN, the medical officer attached, showed great bravery in going forward and attending to the wounded under the heavy and consistent fire which swept the streets. Later one of our patrols had five men wounded as they were advancing to attack the enemy positions and became pinned down under severe enemy fire. On hearing what had happened, Gunn again went forward regardless of his own safety and although unable then to evacuate the wounded, dressed and bandaged them under heavy fire. On all operations Gunn displays the same fine courage.

The MBE has also been awarded for gallant and distinguished services in Burma and on the Eastern Frontier of India to Captain L. M. Kelly, MB LOND, IMS (seconded IAMC).

British Association of Physical Medicine

This association is meeting at 11, Chandos Street, London, W.1, on Saturday, Feb. 5, at 2.30 PM to discuss the place of physical medicine in teaching and in practice.

Pharmaceutical Society of Great Britain

On Thursday, Feb. 10, at 7 PM, at 17, Bloomsbury Square, London, W.C.1, the Harrison medal will be presented to Mr. A. J. Ewins, FRS, who will afterwards deliver the Harrison lecture. He is to speak on progress and problems of chemotherapy.

Society of Chemical Industry

On Wednesday, Feb. 9, the nutrition panel of the food group will meet at 2.30 PM, in the rooms of the Chemical Society, Burlington House, Piccadilly, London, W.1, when Mr. F. A. Robinson, FIC, will speak on the vitamin-B_2 complex —some recently characterised components.

Medical Casualties

The following casualties among RAMC officers have been announced:

Killed.—Captain David Robert Harbison, MB SYDNEY; Captain James Lindsay Shanks, MB EDIN; Captain David Warrington Forgan, MB LPOOL; and Captain James Ernest Thomas Munn, LMSSA.

Died of Wounds.—Captain William Hunter Lang, MB GLASG.

Died.—Captain Evnine, BM OXFD; Captain Edward Moore Gamble, MB DUBL.; and Major Donald Uredale Owen, MD LPOOL, FRCP.

Wounded.—Colonel E. C. Beddows, MC, MRCS; Lieut.-Colonel H. D. F. Lytle, MB LOND.; Captain A. F. Crook, MB BELF; Captain B. S. Lush, MB LOND.; Captain J. A. L. Naughton, MB EDIN.; Captain G. H. Pickering, MRCS; and Captain T. P. W. McCarthy, MRCS.

Prisoner of War.—Captain D. O. Davies, MRCS; Major G. H. Garlick, MRCS; Lieut.-Colonel W. G. Harvey, MRCS; Captain E. Leigh; Captain J. D. Lodge, MB EDIN; and Captain Brian Mayne, MB DUBL.

We are informed that Captain J. C. Seddon, MB MANC., formerly reported killed has now been officially posted as missing, believed prisoner of war.

Medical Women's Federation

At a meeting of the London association to be held at BMA House on Saturday, Feb. 19, at 3 PM, Dr. Jean Dollar will speak on uses of sulphonamides in ophthalmology.

Royal Sanitary Institute

A meeting will be held at Bournemouth on Saturday, Feb. 19. The Mayor will welcome delegates at the Town Hall at 10.15 AM and afterwards Dr. Vida Stark will speak on health education at infant welfare centres and war-time nurseries, and Mr. William Riley on food hygiene of hotels and restaurants.

LIVER EXTRACT.—A new order under Defence Regulations made by the Minister of Health forbids the use of any liver extract, including desiccated liver, except for the treatment of pernicious or other megalocytic anæmias, and forbids the use of any liver extract other than injectable or proteolysed liver extract.

Appointments

GRIFFIN, W. P., MB DUBL.: examining factory surgeon for Yalding, Kent.

PHILIP, D. N., MRCS: examining factory surgeon for Kingsclere, Hants.

Births, Marriages and Deaths

BIRTHS

BALFOUR.—On Jan. 28, in London, the wife of Surgeon Lieut.-Commander H. M. Balfour, RNVR—a son.

BARNES.—On Jan. 25, at Ipswich, the wife of Captain C. O. Barnes, MBE, RAMC—a daughter.

BIRD.—On Jan. 28, at Reading, the wife of Dr. J. G. Bird—a son.

MARSHALL.—On Jan. 21, at Tonbridge, the wife of Dr. J. B. Marshall of Hadlow, Kent—a daughter.

MILLS.—On Jan. 23, at Oxford, the wife of Dr. J. N. Mills—a daughter.

MURRAY.—On Jan. 22, at Oxford, the wife of Major R. O. Murray, RAMC—a son.

MARRIAGES

PARKINSON—BARRICK.—On Jan. 22, in London, Robert Penrose Parkinson, LMSSA, flight-lieutenant RAFVR, to Dorothy Barrick.

SEWARD—MILLIGAN.—On Jan. 22, in London, Eric Canton Seward, MRCP, to Elsa Marguerite Milligan.

WALFORD—GLEIBERMAN.—On Jan. 17, at Birmingham, Adolph Walford, squadron-leader, of Cricklewood, to Rita Gleiberman, MB, flight-lieutenant, of Harborne.

DEATHS

COLE.—On Jan. 28, at Ross-on-Wye, Arthur Frederick Cole, FRCSE, formerly of West Malling, Kent.

CUNNINGHAM.—On Jan. 26, at Edinburgh, John Baird Cunningham, MB EDIN.

DAVOREN.—On Jan. 23, at Redhill, Vesey Henry William Davoren, LRCPI, major RAMC retd., aged 81.

HARRISON.—On Jan. 25, at Redhill, Charles Edward Harrison, CMG, CVO, MB LOND., FRCS., late brigade surgeon lieut.-colonel, aged 91.

ROBINSON.—On Jan. 26, at Oxford, Archibald Louis Robinson, MB DUBL., surgeon lieut.-commander RN retd.

STANSFIELD.—On Jan. 25, at Reading, Tom Stansfield, MB LOND., FLS., aged 57

WOODS.—On Dec. 17, Charles Rolleston Woods, MD DUBL., FRCSI, DPH, lieut.-colonel RAMC retd., aged 90.

YOLLAND.—On Jan. 24, at Bromley Common, Kent, John Horatio Yolland, CBE, MRCS, aged 80.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export.

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ANAEROBIC INFECTIONS IN TRIPOLITANIA AND TUNISIA

J. D. MACLENNAN, M D ABERD
MAJOR RAMC

WESTWARDS from Tripoli, along the line of advance of the Eighth Army, the country, though sandy and arid to a degree, has been highly developed in recent years, and is now under more or less active cultivation as far as the Tunisian border. Here the desert again breaks through to the coast, and except for a few small areas of spring sowing holds sway until Medenine. But this is its last encroachment; beyond and all the way to Tunis stretches a chain of rich and fertile coastal plains, separated at wide intervals by ridges of low hills running down from the central mountains to the sea. As might be imagined, the pitched battles of this final phase of the North African campaign—Mareth and El Hamma, Akarit and Takrouna—were fought out among these ridges and their related wadis, with the result that, apart from skirmishes between patrols, little or no fighting took place either in the highly cultivated level ground or in the short stretch of desert. Neverthless the anaerobic flora of these battlefields is far richer than that of the great deserts of Egypt and Cyrenaica, and a corresponding increase in the incidence of anaerobic infections was to be expected. This expectation was fulfilled. On the other hand, the incidence of the more truly pyogenic infections appears (on somewhat limited data) to have been strictly comparable with that of previous campaigns.

The various types of anaerobic wound infection have been described in a previous report (MacLennan 1943). All that I intend here is to assess their incidence, to note new or unusual features, and to discuss such fresh points as have emerged concerning their pathology, diagnosis, and treatment.

Simple Contaminations

It is difficult to give accurate figures for this type of case. To swab each wound and examine in detail for anaerobes each resulting culture was a procedure that seemed neither feasible at the sorely tried hospitals in Tripoli, nor desirable in the one field laboratory, where other more pressing investigations were in progress. However, from discussions with surgeons and pathologists, from a study of laboratory findings in the base hospitals, and from the results of a small series of 63 wound swabs, mostly taken after the battles of Akarit and Takrouna, it seems probable that at least 45–55% of wounds contained anaerobic organisms; and this is certainly a minimum figure. Compared with the desert wounds, the proteolytic species—and notably *Cl. sporogenes*—have become considerably commoner. Of 33 wounds containing clostridia, 23 (69%) showed proteolytic varieties, compared with an incidence of 32% in a very much larger series from the Western Desert.

Despite this change in flora it cannot be said that any unusual features were observed in these infected wounds; they were possibly a little smellier than before, but even that is doubtful. In any case no safe conclusion could be drawn from so small a series. Apart from one point (to be dealt with presently) there is nothing new to record about the treatment; indeed in this respect great innovations seem not only unlikely but unnecessary.

Anaerobic Cellulitis

Notwithstanding the absolute increase of anaerobic organisms in these war wounds and the relative increase of the proteolytic species, the incidence of anaerobic cellulitis has been low: only 37 cases are known to have occurred, and although some have probably been missed, the figure cannot be higher than 45 or 50. This is an incidence of about 7 per 1000 wounded, as compared with an estimated 10 or 12 per 1000 in the first two years of war in the Middle East in a much less heavily infected terrain.

Yet this reduction in morbidity is not to be wondered at, for anaerobic cellulitis, unlike gas gangrene, is not a specific and definite infective process; it is merely the late result of any dirty penetrating wound which has either never been treated or (far more commonly) has been inefficiently treated. Of the small number of cases I have seen in the forward areas, all, naturally enough, belonged to the first category: it is a tribute to the efficiency of the field surgeons that so few of the second were seen at the base hospitals. Nothing, of course, could better the value of efficient primary surgical treatment. While the massive debridements and wide excisions of the last war were rarely if ever practised, it has been the policy to cut away all dead and clearly dying tissue, to secure adequate drainage for every part of the wound (a most important and frequently neglected point), to leave the wound itself widely open, and to ensure and maintain immobilisation. The figures already quoted speak to the value of such measures.

In the field most of the cases followed small local engagements rather than the major battles—Mareth, Akarit and the rest. This is not so much evidence that the more heavily contaminated soil of the arable plains was especially likely to lead to such infections, but rather as a further indication of the need for early and thorough surgical treatment; for it must be remembered that the evacuation of the wounded from these minor affairs was almost inevitably much slower and more difficult than in the pitched battles of the campaign, which, being either planned or anticipated long before, were always more highly organised. This really is the one point that seems worth re-emphasis here—that anaerobic cellulitis is always a relatively late result of wounding. It has never, so far as is known, appeared within 36 hours, and often much later. But, once recognised, it is a satisfying simple condition to treat: wide opening of the wound, removal of dead tissue, and adequate (frequently through-and-through) drainage are all that is required.

However, merely because the treatment of anaerobic cellulitis is so sure and so simple, it is not a condition to be regarded lightly; for, even if gas gangrene does not supervene, the spread of infection in the tissue spaces may be so rapid and extensive as to call, even within a few hours, for much more radical surgery.

On the other hand, it is essential to differentiate accurately and at once between this type of infection and true gas gangrene. With the increase in this campaign of the last-named disease, the surgeons—especially those with relatively little war experience—were inclined to diagnose gas gangrene too readily, and to regard the presence of gas as the most important criterion instead of the least. Two cases diagnosed as gas gangrene are known to have been merely anaerobic cellulitis (in one a leg was needlessly amputated) and four more are under strong suspicion. The reason given in all these cases—and so far as can be ascertained the only reason—was that these were gas infections and that crepitation was spreading rapidly in the affected limb. It should therefore be pointed out that, in true gas gangrene, gas is rarely a prominent feature until late in the disease and may be quite undetectable clinically; pain, swelling, œdema, and a rapidly increasing toxæmia are always present from the start, and in their absence it should be very difficult to sustain a diagnosis of gas gangrene.

Gas Gangrene

In this campaign there have been 44 cases of gas gangrene—an incidence of between 6 and 7 per 1000 wounded as compared with 3·4 per 1000 in the first two years of war in the Middle East. It is very unlikely that any case has been overlooked and it is believed that this figure is an accurate one. (The exact incidence cannot be given, for the figures of the total wounded are not yet absolutely final.) Information about these cases is, on the whole, remarkably complete, especially from the clinical aspect.

INCUBATION PERIOD

The incubation period has varied from 5 hours to 29 days. If the exceptional case of 29 days is excluded, the average of the other 43 cases is 1·6 days. No correlation could be discerned between the length of the incubation and the clinical picture, the degree and type of injury, the nature of the bacterial flora, or the ultimate outcome.

VASCULAR DAMAGE

Of the 44 cases there was severe trauma to a major artery in 28, and to a major vein only (the femoral) in one—in all 29 cases or 65% of the total. It is of course well known that injuries of this nature are important in the

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establishment of the disease, but they appear to have had little influence either on the incubation period, the symptoms, or the end-result. Of the 13 fatal cases only 5 had severe vascular damage, and these included the one with the severed femoral vein. In only 2 instances can it be said with assurance that long-continued application of a tourniquet precipitated the infection; but information on this point is far from adequate. In no case can the onset be attributed to too tight a plaster.

SITE OF THE WOUND AND TYPE OF INJURY

The site of the wound in the 44 cases is shown in table I. These figures merely confirm earlier findings that the vast majority of such cases (in the present series 71%) involve the buttock, thigh and leg, and that gas gangrene of the buttock is especially dangerous, 2 out of 4 being fatal.

TABLE I—INFECTION ACCORDING TO SITE OF WOUND

Outcome	Head	Arm	Thorax	Abdomen	Buttock	Thigh	Leg	Total
Fatal ..	1	3	1	0	2	3	3	13
Recovered	1	7	0	0	2	10	11	31
Total ..	2	10	1	0	4	13	14	44

The available information on the type of injury is set out in table II.

TABLE II—TYPE OF INJURY

Type of injury	Cases		
	Fatal	Recovered	Total
Traumatic amputation	3	1	4
Bony injury present	4	11	15
Muscle laceration only	6	18	24
Minor injury ..	0	1	1
Total	13	31	44

Fully analysed figures of the total casualties are not as yet available; so no attempt can be made to assess the significance of these findings. There has been no obvious relationship between the nature and extent of the injuries and any other clinical manifestation.

GEOGRAPHICAL LOCATION

If the cases are grouped according to the geographical sites—more strictly, the actual battles—in which the wounds were inflicted, some interesting points emerge (table III).

TABLE III—INFECTION ACCORDING TO GEOGRAPHICAL LOCATION

Battle	*Number of cases*
Mareth/El Hamma	16
Wadi Akarit	11
Takrouna	5
Other engagements	12

At least 80% of all the casualties in the Eighth Army during the advance beyond Tripoli occurred in the pitched battles. Yet even so, while the incidence of gas gangrene after the battles of Mareth, Akarit and Takrouna was between 2 and 3 per 1000 wounded, after various minor engagements and skirmishes between patrols it was between 8 and 9 per 1000. As in the case of anaerobic cellulitis, it seems probable that the greater delay in evacuation and in receiving primary treatment was of paramount importance.

CLINICAL PICTURE

There is little of fresh interest to record concerning the clinical picture. But the following case of infection with *Cl. œdematiens* is perhaps worth reporting, for from the first the correct bacteriological diagnosis was made upon purely clinical evidence.

The man was a gunner wounded in the head and right shoulder at Wadi Akarit.

April 13.—Wounded at 06.30 hrs. At advanced dressing-station 2 pints plasma given and shoulder packed. At main dressing-station (17.30 hrs.) 3 pints plasma and 2 pints blood given quickly, and then 1 pint plasma slowly. Wound in shoulder and back plugged with gauze.

April 14.—07.30 hrs.: much improved; plug removed; soft-paraffin and sulphanilamide dressing applied. Routine oral treatment with sulphonamides commenced. Antitetanic serum given. Evacuated to casualty-clearing station. Admitted 16.30 hrs. Large perforating shell wound; entrance in right acromial region; exit medial to left scapula near lower angle. Upper wound deep with skin margins appearing gangrenous. Wounds dressed with sulphanilamide-paraffin gauze. No evidence of gas gangrene, but watch for hæmorrhage and anaerobic infection.

April 15.—Toxic, pale; pulse-rate 150; temp. 100·0° F.; respirations 32. 09.00 hrs.: X ray of head (where there is a large tangential wound) negative. 2 pints of blood given. 12.00 hrs.: general condition deteriorating; has not responded to resuscitation. Whole shoulder and scapular region painful, tender and grossly œdematous, with moderately profuse serous ooze from the wounds. Scapula and clavicle greatly shattered, humerus appears intact. No distinctive odour, but clinical appearance very suggestive of gas gangrene.

Operation (14.00 hrs.) under gas-and-oxygen. Exit and entrance wounds joined, laying open whole track, with extensions. Infraspinatus, supraspinatus, subscapularis, origin of deltoid and insertion of trapezius found to be infected, necrotic, and gangrenous; patchy discoloration, mainly pale reddish-yellow, but also areas of dull red, purple, and dark green. No gas in muscles, but great œdema—thick, gelatinous, and firm. Œdema not limited to the muscles but involving all related tissues, especially subcutaneous. No obvious hæmorrhagic areas, other than those caused by direct trauma.

Note.—The above account is based partly on statements in the field medical card, partly on notes kindly supplied by Major T. W. Harrison, NZMC (the surgeon in charge at the CCS), and partly on my own records made at the time. Details of subsequent progress of the case are omitted as irrelevant here.

In almost every respect this may be regarded as a classical case. The rather long incubation period (50 hours); the rapid progress of the disease once established; the profound shock and toxæmia quite uninfluenced by transfusions of blood; the small degree of pyrexia; the extreme œdema of the tissues; the profuse serous exudate; the absence of hæmorrhage, of gas, or of any distinctive odour—individually each of these may be found in any clostridial infection of muscle, taken together they make up a clinical picture which is unmistakable.

Since the clinical term "gas gangrene" is still employed, it must be emphasised that, in clostridial infections of muscle, gas is a variable, and, per se, a valueless criterion. Pain, swelling, and toxæmia, on the other hand, are constant features; and of these pain, being the first to appear, is of the greatest significance. In fact it is not too much to say that, in war-time, the possibility of an anaerobic myositis must always be borne in mind when there is a sudden and unexplained onset or increase of pain in an infected wound.

One other minor point is perhaps worth mentioning here. It has been observed that as a result of severe vascular damage, gross changes, superficially suggestive of gas gangrene, may occasionally appear in the related muscles. These are paler than normal, have a rather boiled, coagulated look, react sluggishly to stimulation and bleed with difficulty; but they are not infected, they are merely subacutely anæmic. This indeed gives a clue to the differential diagnosis—the lack of any obvious signs or symptoms of muscle infection. Œdema, exudate, foul smell, pain, and systemic disturbances—all are absent or minimal. There can be little doubt that if suitable organisms were present, a true infective myositis could readily supervene, but this is by no means inevitable. For this reason, all such cases should be treated initially not with excision but with circumspection.

PATHOLOGY, BACTERIOLOGY AND DIAGNOSIS

One unusual case of metastatic gas gangrene was observed—the third of this nature I have seen, and the fourth known to me in the last three years of war in the

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Middle East. These four cases, will, however, be dealt with in a separate communication.

The bacteriological investigation of the 44 cases has not been at all exhaustive. I fully analysed the anaerobic flora in 12, and some information is available about 7 others.

Of these 19 cases *Cl. welchii* was recovered from 17, *Cl. œdematiens* from 5 (with 7 others doubtful), and *Cl. septicum* from 1 (with 7 doubtful). It will be seen that compared with the flora of the desert wounds (MacLennan 1943), *Cl. welchii* has become rather commoner, while the incidence of *Cl. œdematiens* and *Cl. septicum* has remained the same. Indeed, so far as they go, the results tend merely to confirm previous findings, but with so small a series it would be foolish to generalise.

Diagnosis has on the whole been early and accurate, and has rarely presented much difficulty. The value of tests for hyaluronidases in the wound exudate will also be discussed separately (MacLennan 1944).

SURGICAL TREATMENT

Of the 44 patients, 13 died; this gives a recovery-rate of 70%—a figure that compares favourably with any recorded series of similar size. This success is to be attributed to accurate diagnosis, good surgery, and intensive serotherapy.

Surgery is, and will almost certainly long remain, the primary and essential method of treatment in gas gangrene. The figures already quoted demonstrate that the surgical measures employed in this campaign were excellent, but they do not reveal the success attending the practice of a relatively conservative surgical technique.

It is, unfortunately, still the constant endeavour of certain surgeons, in the Middle East and elsewhere, to amputate or attempt to amputate in each and every case of gas gangrene of the extremities. That this is not necessary is brought out by the figure for the 37 cases in the present series in which limbs were involved (table IV). Furthermore, 3 of the cases listed as "amputations"—(1 fatal and 2 recovered) were in fact the

TABLE IV—SURGICAL MEASURES EMPLOYED

Type of case	Resection	Amputation	Total
Fatal	2	7	9
Recovered ..	20	8	28
Total	22	15	37

end-results of traumatic amputations, not, strictly speaking, operative undertakings in themselves. I do not for a moment imply that massive involvement of a limb does not call for extremely radical treatment; but when only single muscles or limited groups of muscles are infected, a careful resection, combined with such secondary therapeutic measures as are detailed below, will often not only halt the infection and save the patient's life, but also leave him with a limb of good or at any rate reasonable function.

It is only fair to point out that the present series is to some extent a selected one, in that 33 of the 44 cases occurred in the forward areas, and were on the whole early and fairly localised infections. But this does not affect the main argument.

SULPHONAMIDES AND PROFLAVINE

For the past 7–8 months it has been the policy in the Middle East to give sulphonamide drugs in very large doses, both locally and generally, in gas gangrene. The compounds used almost exclusively have been sulphanilamide powder dusted into the wound, and the sodium salt of sulphathiazole by intravenous drip; as much as 20 grammes of the powder and 50–60 g. of sulphathiazole has quite commonly been given within 48 hours. Although no ill effects were ever observed from such medication, it was felt that these massive doses might perhaps be unnecessary, and with the coöperation of various surgeons certain cases have been treated with rather smaller amounts.

The dosage was reduced from case to case whenever practicable, until in the end 5 were treated with between 10 and 15 g. sulphanilamide powder locally, and 15 g. sulphathiazole per diem for one or two days, followed as a rule by a short routine course of 4–6 g. daily. In 4 of these cases the sulphathiazole was given intravenously in a slow drip for the first 24 hours, in the 5th (which was much less toxic) it was administered by mouth from the start. Each case was in every way typical: in 2 the thigh was infected, in 2 the leg, and in 1 the arm. All made uneventful recoveries. In 2 further cases of local gas gangrene, involving in one instance the temporalis muscle, in the other the tibialis anticus, even smaller doses were given: both, in addition to their local sulphanilamide, received a total of 28 g. sulphathiazole orally over five days—8 g. on the first day, and thereafter 5 g. daily. These patients also made good recoveries, but the infections here were very local. It was not found possible to treat any other case with small doses of the sulphonamides.

On the other hand, it should be pointed out that of the 44 cases in the present series, 4 received no sulphonamide, and all 4 died, although 2 had gas-gangrene antiserum.

To sum up, on both experimental and clinical evidence it seems undesirable to discontinue the use of sulphonamides in the treatment of gas gangrene, but the very large amounts recently employed in the Middle East are probably unnecessary. Further investigations to ascertain the minimal dosage are clearly desirable. It is perhaps worth bearing in mind that in the Middle East infection with *Str. pyogenes* has not on the whole been a serious problem, and the above findings may not apply to other theatres of war. Finally, if the patient is at all toxic—and he nearly always is—administration should be by intravenous drip.

Proflavine.—In 6 cases (4 consecutive) proflavine powder was dusted directly into the wound in place of local sulphanilamide; the routine medication with sulphathiazole continued. One of these patients died, the other 5 made uninterrupted recoveries. Unfortunately, although the later history of these cases is known, it was not feasible to follow them through their convalescence, and it is not known whether the wounds showed the necrotic and hæmorrhagic areas described by Russell and Falconer (1943). No mention of such reactions was made.

SEROTHERAPY

Of the 31 patients who recovered from gas gangrene, only one received less than 49,500 international units of antiserum (i.e. 3 ampoules); he had 33,000 and was not particularly toxic. In most cases the dosage was much in excess of this, the average for the 31 being between 90,000 and 100,000 IU. The serum was nearly always given intravenously—either quickly with a syringe in the very acute cases, or, more commonly, in a slow drip along with blood, plasma, or glucose-saline. I observed no reactions in the 24 cases of which I have personal knowledge, and none have been recorded in the other 7.

Of the 13 fatal cases, on the other hand, 4 received no antiserum: 3 had only 16,500 IU (intramuscularly or, in one instance, intravenously); and 1 had 33,000 IU intravenously. The remaining 5 cases had all been given 49,500 IU or more and merit more detailed inquiry.

CASES 1 and 2 were profoundly ill at the time of operation, both with multiple shrapnel or mortar injuries. In each case a clostridial myositis involved only one of their many wounds, and was not, so far as could be judged, the principal cause of their very grave condition. Neither of these men fully recovered from the anæsthetic; both died within 24 hours of operation.

CASE 3 was admitted untreated to a CCS, 48 hours after wounding, with advanced gas gangrene of the left thigh. He was then too ill for operation, and in the next 24 hours he was given no less than 11 pints of blood and 49,500 IU of antiserum intravenously. Considerable improvement at first resulted, but it was not maintained, and amputation at the thigh was carried out. He died within an hour without regaining consciousness.

CASE 4 had a partial traumatic amputation of the right foot, which was completed surgically 12 hours after the injury. His condition then much improved, and he was staged down to a base hospital. On arrival there 5 days later his condition was poor, and he was found to have developed gas gangrene in the right leg and remnants of the right foot. He was given

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3 pints of blood and 1 pint of glucose-saline, and then operated on. His right leg was amputated below the knee, the flaps being left open, and 49,500 IU of antiserum was given intravenously. Although very toxic and obviously going downhill, he survived another 3 days, during which he was given, intravenously, blood, glucose-saline, and sulphadiazine, but no more antiserum.

CASE 5, a *Cl. œdematiens* infection of the shoulder, has already been described in some detail under Clinical Picture. At operation, after excision of the infected muscles, proflavine powder was dusted into the wound, and a paraffin gauze dressing applied. After operation he was given, intravenously in a quick drip, 2 pints of blood, 82,500 IU of antiserum, and 30 g. of sodium sulphathiazole. All, however, to no avail; he died within eight hours, never fully regaining consciousness.

Of these 5 cases, Nos. 1 and 2 require no comment, and No. 3 will be discussed more suitably in a later section.

Case 4 was instructive in showing the need for a perseverance in dealing with these toxic infections. Although no hard-and-fast rule is possible, 49,500 IU may be regarded as the minimum initial therapeutic dose of antitoxin for a patient who has received adequate surgical treatment and is not extremely collapsed; and, so far as can be judged from subsequent discussions—I did not see him—this man was not at first profoundly ill. Normally, after such medication, the patient either rallies dramatically and is soon obviously on the road to recovery, or else, more rarely, goes steadily and equally rapidly downhill. Indeed in over 90% of *treated* cases of gas gangrene the outcome is perfectly evident within 12 or at most 18 hours. In a few instances, however, of which case 2 is a good example, the results of therapy are rather less spectacular. The patient, at first slightly better, slowly and progressively relapses into his previous state of toxæmia and shock; yet examination of the original site of the infection—provided it is still attached to him—will usually reveal remarkably little to account for his condition. (We are not dealing here with cases in which effective surgical treatment has not been possible.) It is then essential to persist in administration of antiserum. The rationale of antitoxin therapy is, of course, neutralisation of circulating toxin, and in gas gangrene antiserum must be given so long as toxæmia persists. Again no definite rules of dosage can be laid down, but certainly never less than 49,500 IU should be given at any one time, and unless there is obvious and sustained improvement this dose should be repeated at intervals of not more than eight hours, preferably by the intravenous route. Of the 44 patients under review, 2 others, in almost every respect similar to case 2, were treated in this way, and both recovered, although one was desperately ill for four days.

Often it is of great benefit to commence administration of the antiserum before or during operation. Indeed, this technique, though rarely employed, might be worth adopting as a routine.

I realise, of course, that the remarks made above are self-evident and familiar. I emphasise these points because, obvious or not, their neglect has already endangered the lives of battle casualties, and may well do so again.

Case 5, though less instructive, is of much greater importance. So far as can be judged, this man was treated under almost ideal circumstances: his condition was correctly diagnosed within a few hours of onset, even to the presumptive bacteriological type of infection; he was treated carefully, thoroughly, and without delay by a very experienced surgeon; and at the end he received what seemed to be an adequate dose of polyvalent antiserum. All this, however, was without obvious effect, and he went steadily downhill.

There seem to be five possible explanations. (1) The patient was already too shocked and toxic to react effectively. (2) The dose of antiserum was insufficient. (3) The antiserum was inactive. (4) A focus of infection was left behind at operation. (5) A pathogenic anaerobe other than *Cl. welchii*, *Cl. septicum*, or *Cl. œdematiens* was also present. Of these the first two merit serious discussion; but the others, may be regarded as improbable though not quite impossible.

1. *Condition of the patient.*—This man can have had a clostridial myositis for at most only a few hours, and though ill and obviously growing worse, was not particularly shocked at the time of operation. He was certainly not considered a bad risk either by the surgeon or by the resuscitation officer—both unusually experienced. At the end of the operation he was definitely in worse shape, but his recovery was confidently anticipated.

Although the extremely acute development of *Cl. œdematiens* infections is fully appreciated, it is not felt that the loss of this case was due primarily to delay, or to operating on a man in poor condition. Indeed, even in retrospect, it is difficult to see how he could have been dealt with earlier.

2. *Dosage of antiserum.*—The second possibility—that the serotherapy was inadequate—has much to recommend it, for the man undoubtedly died a toxic death. In point of fact, I know of 3 other fatal cases of *Cl. œdematiens* infection in which the dosage of antitoxin was felt (after the event) to have been too small, and it was for this reason that in case 5 as much as 82,500 IU of the polyvalent antiserum was given, although there were no signs of unusual toxicity. But this amount of antiserum, however impressive superficially, contains only 15,000 IU of *Cl. œdematiens* antitoxin and clearly was hopelessly insufficient.

Because in the last war *Cl. œdematiens* was apparently one of the rarer pathogenic anaerobes, the relative titre of its antitoxin has always been low in the polyvalent gas-gangrene antiserum, although of all the organisms involved it is the least invasive, the most truly toxic. Furthermore, recent work in Europe, in the Middle East and in North Africa (MacLennan 1943), and in the Pacific war zone (unpublished)—makes it clear that *Cl. œdematiens* is much commoner than was suspected.

From this it will be obvious that, in my opinion, the relative dosage of the various gas-gangrene antitoxins, and especially of *Cl. œdematiens*, urgently requires reconsideration. In the Middle East there was neither the time nor the equipment necessary to establish accurate serological data on the subject, and the above remarks are to be regarded not as a dogmatic and baseless generalisation, but merely as a plea for further discussion and inquiry by more experienced and competent investigators.

OTHER FORMS OF INTRAVENOUS THERAPY

It would be hard to exaggerate the importance of transfusion therapy in gas gangrene. Of the 44 cases, 41 were given blood, plasma, or glucose-saline, usually in very large amounts; and had the other 3 patients lived long enough they too would no doubt have required and received such treatment. It must always be borne in mind that in these anaerobic infections of muscle, quite apart from the hæmorrhage and shock attendant upon any large or deep wound, there is often a constant and profuse serous soakage from the infected tissues; rather less commonly, an actual intravascular hæmolysis; and, quite invariably, a profound and progressive toxæmia, which manifests itself, above all, by circulatory failure and collapse. The disastrous effect of such a series of events must be obvious, the urgent need for transfusion equally so. Indeed, it is no exaggeration to say that every case of gas gangrene will sooner or later require some form of intravenous medication.

The whole question of transfusions and resuscitation is now so much a province of the specialist that any detailed comments here would be superfluous. Two minor points do, however, seem worthy of mention.

Although, as a general rule, blood has proved to be of infinitely greater value in gas gangrene than either plasma or serum, a small number of cases—mostly, but not exclusively, infectious with *Cl. œdematiens*—have occurred in which blood seemed to produce little or no benefit, whereas plasma brought about immediate improvement. In some of these cases there was considerable hæmoconcentration (caused, presumably, by the serous ooze from the infected muscles), but it is not yet certain whether this is the only, or even the most important factor. Of the 44 cases, 2 were of this nature, but I found it impossible to examine them until they were semi-convalescent, and could obtain no information of value. Attention has been drawn to this type of reaction not only to stress the importance of plasma, but in the

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hope that a watch will be kept for similar cases, and more information obtained about their pathology.

Though probably every case of gas gangrene requires a transfusion, such wholesale intravenous medication, because of its very efficacy, is not without its dangers. In 6 of the cases under review, of which 4 (including case 3) were fatal the extremely acute and essentially toxic nature of gas gangrene was not appreciated, and desperate, and quite unavailing efforts were made at resuscitation by the use of very large quantities of blood. This occurred sometimes as a result of misdiagnosis, more commonly through lack of appreciation of the factors involved, and it inevitably reduced the patient's chances of recovery. In gas gangrene, if a man is too ill for operation, he is unlikely ever to be fitter than immediately after the rapid administration of 2 pints of blood or plasma and 80,000 to 100,000 IU of antiserum: more prolonged efforts at resuscitation will not as a rule keep pace with the increasing toxæmia. (This, of course, is on the assumption that the patient's shock and collapse are due primarily to an anaerobic infection.) If at the end of such treatment he is still unable to withstand major surgery, considerable temporary improvement may be obtained merely by wide and deep incision into the infected muscles, combined with further intensive serotherapy. Though all such cases are desperate, their general condition can usually in this way be sufficiently improved to justify more radical treatment at the end of another six hours. Unfortunately, the local infection is then often anatomically too far advanced to permit of any really life-saving operation. It may well be that penicillin, locally or intramuscularly, will prove of the greatest service in such cases.

PROPHYLAXIS

There is nothing new to record here concerning the use either of antiserum or of sulphonamide drugs. To assess the prophylactic value of the sulphonamides seemed too complex an undertaking in the field; but it was hoped to obtain information on the early use of antiserum, and to this end one infantry division was supplied with stocks sufficient for every battle casualty to receive 16,500 IU at the regimental aid-posts. Unfortunately for the experiment, the main battle swung over to the First Army sector, and this division did not again go into action. It is intended, however, to carry out a similar clinical trial, if possible on a much larger scale, in some future campaign.

Proflavine powder was issued to two of the forward CCSs, with the request that its use be confined to late or dirty wounds with extensive muscle damage. A total of 186 cases were treated in this way, and none developed a serious anaerobic infection, or in fact serious infective complications of any sort. Unfortunately, a detailed follow-up of these cases was not found practicable in the middle of a campaign. No adequate bacteriological investigations were made, and the evidence, at best, is purely negative. Nor was there any information about the necrotising action of proflavine. However, subsequent experience has shown that this type of reaction undoubtedly does occur, and that proflavine is lethal to tissue cells as well as to bacteria. In the chronic suppurative conditions originally treated by Mitchell and Buttle (1942) this histotoxic activity was of relatively small importance; but in a fresh wound it would obviously delay organisation and repair, and for this reason the routine early use of powdered proflavine cannot be recommended. In such acute and dangerous infections as gas gangrene this argument is not necessarily valid, and further clinical trial seems not only justifiable but desirable.

Anaerobic Streptococcal Myositis

There are records of 7 cases of this nature during the campaign, of which only 2 recovered. This type of infection appears relatively late, and so is rarely seen in the forward areas; and, in point of fact, 6 of these cases were reported from the base hospitals. The 7th—the only one I saw—was in every way typical, was readily diagnosed, responded well to treatment by conservative surgery and sulphathiazole, and requires no special comment. Of the other cases 5 occurred in a single hospital, and are being described in detail by the surgeons and pathologist concerned.

Fusospirochætal Infections and Tetanus

No fusospirochætal infections were observed.

There are records of only 2 cases of tetanus. One patient was a South African native and the other a German prisoner. Neither had received prophylactic antitetanic serum; neither is at all likely to have been actively immunised. So far as they go, these cases support previous findings (Boyd and MacLennan 1942).

Summary

When fighting moved from the Western Desert to the more cultivated areas of Tripolitania and Tunisia the incidence of gas gangrene increased from 3·4 per 1000 wounded to approximately 6 or 7 per 1000 wounded.

In 28 of 44 cases of gas gangrene a major artery had suffered severe trauma; in one other instance a major vein was injured. In only 2 cases had the infection been apparently precipitated by long-continued application of a tourniquet.

The wounded from small skirmishes between patrols were often evacuated with difficulty and after some delay and were therefore more liable to gas gangrene than those injured in pitched battles; the figures being 8 or 9 per 1000 wounded in patrol encounters as against 2 or 3 per 1000 wounded in pitched battles.

It is again emphasised that "clostridial myositis" is preferable, as a descriptive term, to "gas gangrene." Gas is often abundant in anaerobic cellulitis but in true clostridial myositis (gas gangrene) it is rarely a prominent feature until late in the disease and may not be detectable clinically.

The essential features of clostridial myositis (gas gangrene) are pain, swelling, œdema and a rapidly increasing toxæmia.

In this series of 44 cases, 13 died. The recovery-rate of 70%, which compares favourably with any recorded series of similar size, is attributed to accurate diagnosis, good surgery and intensive serotherapy.

Antitoxin must be administered early, repeatedly and in adequate amounts, intravenously or intramuscularly; three ampoules may be regarded as a minimum therapeutic dose. So long as toxæmia persists antitoxin therapy must continue.

It appeared that conservative but adequate surgical procedures backed by chemotherapy, intensive serotherapy, and appropriate measures of resuscitation gave better results than more drastic operative measures.

This report had to be prepared in the field, away from any medical library or large laboratory. This will, it is hoped, excuse to some extent certain of the more obvious defects.

The very great debt I owe to many medical officers in the Eighth Army will be self-evident; indeed it is in no way an exaggeration to say that without their continued assistance and coöperation my report could never have been written. With so many to thank it would be invidious to mention names: all were unfailingly helpful and kind.

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PRODUCTION OF MEPACRINE.—In a comprehensive review of the war effort of Imperial Chemical Industries, Ltd., delivered at the Glasgow Chamber of Commerce on Feb. 1, Lord McGowan mentioned how the company had helped to fill the gap left by the cutting off of supplies of drugs from Germany. As an example, he said that in 1940 they had produced 600,000 tablets of mepacrine, whereas in 1944 they would be making over 1,000,000,000. These were sent not only to our own troops in the East, but also to the United States and Australian troops fighting in the jungles of the South-west Pacific.

ROYAL COLLEGE OF NURSING.—At its meeting on Jan. 20 the council decided to set up an advisory board on nursing education, under an independent chairman, to include experts on general education from schools and universities, and representatives of various aspects of medicine, including social medicine. Representatives of Government departments will be invited to attend as observers.

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SUPPLEMENTARY FEEDING IN PREGNANCY

MARGARET I. BALFOUR, CBE, MB EDIN, FRCOG
LATE CHIEF MEDICAL OFFICER TO THE WOMEN'S MEDICAL SERVICE FOR INDIA

THE experiment here detailed was organised and carried out by the National Birthday Trust Fund with the aid of a grant from the Commissioner for the Special Areas in England and Wales and with the coöperation and help of the medical officers of health and their staffs in these areas. The period of the experiment was from 1937 to 1939.

The Birthday Trust Fund had been distributing foods in these areas from 1935, and though the opinion had been formed that the measures had decreased the maternal and infant mortality no serious control of the results had been carried out. The present investigation was planned in order to watch the results of feeding under controlled conditions. With this object in view the Fund in May, 1937, appointed a special committee whose members were already engaged in obstetrical or nutritional work to organise and watch the experiment.[1] It also arranged for regular visiting of the areas by members of the committee.

The experiment was an attempt to assess the effect of giving expectant mothers specified foods under controlled conditions, the results to be measured by: (1) stillbirth-rates and neonatal deaths; (2) maternal mortality-rates; and (3) toxæmia-rates. Infant deaths during the first 4 weeks of life were counted as neonatal deaths.

SELECTION AND CLASSIFICATION OF MATERIAL

When the scheme was in full working order 10 areas in the North of England and 18 areas in South Wales were receiving the food supplements. These were, in England, Newcastle-on-Tyne, Gateshead, Sunderland, South Shields, Tynemouth, Wallsend, Hartlepool, West Hartlepool, Jarrow, County Durham. In Wales, Aberdare, Bridgend, Caerphilly, Cardiff Rural Area, Gellygaer, Glyncorrwg, Rhondda, Neath, Merthyr Tydfil, Maesteg, Llantrisant, Mountain Ash, Monmouthshire, Penybont, Pontypridd, Pembroke Dock, Port Talbot, Ogmore. In all these places unemployment was acute and the unemployment benefit did not leave any margin for extra food for the expectant mother. The women selected for the foods were of the poorest classes. The medical officers of the clinics made the selection, but as there were not sufficient foods for all there were also many poor women among the control class. It had originally been intended that the general mortality figures for the areas investigated should serve as controls for the rates found in the groups receiving supplementary feeding, but it was soon realised that these two sets of figures would not be fairly comparable. The women receiving the supplementary foods attended antenatal clinics, whereas a large proportion of women in the same area did not; any difference in the mortality-rates of the two groups might, therefore, be due to better general antenatal care rather than to the food supplements. The MOHs were, therefore, asked to give figures for the women who attended antenatal clinics but did not receive Birthday Trust foods and these figures were used as controls. All cases of abortion and miscarriage were excluded both from the groups receiving supplementary foods and from the control groups. The stillbirth and neonatal mortality-rates quoted in this paper do not, therefore, include deaths due to abortion or miscarriage. The records from "fed" cases from districts where there were no controls were excluded from the statistical analysis.

It is necessary to consider if the two classes contrasted are fairly comparable and if there are differences, whether these differences are such as would affect the conclusions reached. The points to consider are: parity; age; social and economic conditions.

Parity.—Respective rates of the two classes as regards parity were as shown in the following table.

1. The cost of the specified foods supplied was covered by the grant from the Commissioner for the Special Areas, and accommodation and secretariat for the research committee was provided by the National Birthday Trust Fund.

It will be seen that there is a higher proportion of primiparæ in the control class, probably owing to the desire of the medical officers to assist the mothers of large families with the supplements. The proportions in the middle group (2-4 confinements) are nearly the same, while in the third group of large families the proportion of fed cases is greater. In addition it should be noted that for the fed class the proportion of cases

—	Primip.	2–4 para	Over 5 para	Total
	%	%	%	
Fed ..	2465 (21·2)	5883 (50·6)	3270 (28·2)	11,618
Controls ..	3352 (41·4)	3679 (45·5)	1064 (13·1)	8095

with parity over 10 is 13·9% of the group, or about 4% of the whole data, while the corresponding proportions in the control class are 6·6% and 0·9%. Yerushalmy,[2] in a study of 82,000 confinements in New York State, shows that the neonatal death-rate is least in the second confinement, that it begins to rise in the third confinement and in the fifth it exceeds that in the first confinement. At the 10th and subsequent confinements he gives the rate as 55·2 per 1000 as compared with 32·1 per 1000 for primiparæ. On the basis of these figures, therefore, the data can be divided into 3 groups (table I). It is evident then that (*a*)

TABLE I—PROPORTIONS IN THE TWO CLASSES (FED AND CONTROLS) FOUND IN THE THREE GROUPS DESCRIBED IN THE TEXT

Group	*Fed* %	*Controls* %
Low neonatal mortality (2–4 para)	50·6 ..	45·5
Moderate neonatal mortality (1 para combined with 5–9 para)	45·4 ..	53·6
High neonatal mortality (10 para +)	4·0 ..	0·9

the proportions in the low mortality group in the two classes are nearly identical; (*b*) the slight excess of the low mortality group in the fed class is counterbalanced (from the point of view of equity in assessing results) by the much higher proportion of 10 para + cases. In the fed class two women were at their 19th confinement, one at her 18th and one at her 17th. One of the controls was also at her 19th confinement.

Age.—As regards age it is found that the proportions of the two classes compared are about equal under 20 years of age. From 20 to 29 years there is a smaller proportion of fed and from 30 years onwards there is a larger proportion of fed.

Years—	*Under 20* %	20–29 %	30–39 %	40 *and over* %
Fed	5·2 ..	52·3 ..	37·0 ..	5·5
Controls	5·6 ..	62·6 ..	28·2 ..	3·6

Yerushalmy states that neonatal mortality is high in mothers under 20 years, that the most favourable period is from 20 to 29 years when it ranges from 28·4 to 30·4 per 1000. After 30 years of age it rises from 30·7 to 46 per 1000. For mothers of 43 and over he gives a neonatal mortality-rate of 59·8 per 1000. In our series, in the age-group 40 years and over, the percentage of women of 43 and over was 17 in the fed and only 8·3 in the controls.

Social and economic conditions.—The women of the fed class were all in very poor circumstances. They were the wives of unemployed men or of low wage-earners. In some of the areas rents were high and when all expenses had been met there was not sufficient to meet the BMA standard of diet, far less to provide special foods for expectant mothers. It has to be remembered in this connexion that the mother of the family distributes the income and finds it hard to satisfy the hunger of the children and to keep her husband in good physical condition. She thinks of herself last or not at all. When asked about her diet a common reply is "Oh, I can do with anything." Towards the end of the week a cup of tea and a bit of bread might be her dinner, this even when she was pregnant. It did not seem to occur to her that the fœtus would be affected by her diet, or if it did she thought more of the children actually there than of the child coming. Many of these mothers were living under

2 Yerushalmy, J. *Amer. J. Hyg.* 1938, **28**, 244.

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slum conditions, overcrowded and insanitary. Those with large families were living under a great strain, constantly trying to make sixpence go as far as a shilling, and failing. There were many individual cases of hardship and distress; one mother had had 6 children in 8 years and found another coming. She described the difficulty of getting enough food for the hungry children and of sending them to school respectable and well shod. She *could not* have another. Would the nurse help her? Another in somewhat similar circumstances found herself unable to cope with the urgent demands of the school authorities to keep her children tidy, better shod and especially less verminous. She said, with calm despair, "I just can do *no more*, nurse." Such cases were scattered through the fed class and the strain left its mark on the mothers.

The women of the control class included some poor, but most of them were of a better economic status, being the wives of men with good wages. There was less overcrowding and the mother was able to provide food for her children without the personal sacrifice which the poorer mothers made. Where there were large families, there might be overwork but there was a lack of the strain and sense of frustration under which the poorer mothers laboured. Although better off financially they were still obliged to do their own housework and so led active lives.

Comparability.—Analysis of the two classes shows that they were not strictly comparable but it also shows that so far as parity, age, and social and economic conditions affect the neonatal mortality, the scales were weighted against the fed group. The adverse effect of the large number of primiparæ among the controls was counterbalanced by the greater number of large families, especially of families exceeding 10, in the fed class. The analysis of the age figures shows that the control group were more favourably placed than the fed. The social and economic conditions also affected the fed class adversely. It can, therefore, be fairly assumed that any favourable results found in the fed were due to the food supplements provided by the Birthday Trust Fund.

The question was raised whether it was possible that the women receiving the supplementary foods attended clinics from an earlier period of pregnancy and so had an advantage over the control class. In order to clear up this question, a special inquiry was made in County Durham where the date on which each woman commenced attendance at the clinic had been noted. In the two classes the numbers who had attended the clinics for 3 months or over, and for under 3 months, were approximately equal, 51% of the women receiving supplementary foods and 53% of the controls having attended the clinics for 3 or more months. The cases compared included 787 women receiving supplementary foods and 624 controls. It is assumed that these women were a representative cross-section of all the women studied and that similar results would have been found in other areas.

FOOD SUPPLEMENTS GIVEN

Each woman on the Birthday Trust roll received the following once a fortnight:

'Ostermilk,' 1 lb., and 'Ovaltine,' ½ lb. In some cases a half pound of 'Colact' (a preparation of dried milk flavoured with chocolate powder) was given in place of ovaltine. In addition either a 4 oz. carton of 'Marmite' or a similar yeast extract, or as an alternative, an 8 oz. bottle of 'Minadex.' The minadex was given as a control for the yeast-marmite group, to exclude a possible psychological effect, and to show whether it was some factor in yeast itself that was operative in reducing the mortality.

It was hoped that this feeding would be additional to the milk given by the local authority, but unfortunately in many cases the women only received the Birthday Trust Fund supplements, the council retaining its milk for those women who could not be put on the Birthday Trust list. Both classes, therefore, received milk in some form and the difference between the two classes mainly lay in the administration to the fed class of marmite or other yeast extract, both containing a rich supply of the vitamin-B complex, or of minadex, a proprietary preparation containing a rich supply of vitamins A and D and calcium, phosphorus and iron. It is estimated that the amounts supplied were sufficient to give the women each day 240 international units of vitamin B_1 or 13,500 international units of vitamin A and 2250 international units of vitamin D. It is to the administration of these supplements that the improvement in mortality noted is attributed.

In nearly all cases the foods were distributed from the antenatal clinics. In a very few cases they were distributed by private practitioners or from an office in the council headquarters. Great pains were taken by the medical officers and their staffs to ensure that the foods were regularly distributed and were not passed on to the family. The purposes of the feeding and especially of the vitamin supplements were constantly explained to the mothers. The suggestion made by the health visitors that the supplements were likely to lead to an easier labour was a very potent inducement to the mothers to persevere, even when the supplements were thought unpalatable.

RECORDS

The name of each woman who received the foods was entered on an individual card which gave particulars regarding the period of pregnancy when the foods were begun, age, and number of previous confinements. The dates of each distribution were entered on the card, also the nature and the amount of the food. Finally, the date of the confinement was entered and the result to mother and child: "satisfactory"; "maternal death"; "stillbirth"; or "neonatal death." The causes of death as entered on the death certificate were asked for and were supplemented by any additional information available from the medical officers or midwives. Similar information was obtained for the control class.

All the results were examined statistically by Mr. J. Plymen, FIA, who is responsible for the tables.

RESULTS

The inquiry, which had been begun in April, 1937, was closed in March, 1939, the grant from the Commissioner for the Special Areas having been discontinued. The individual cards of 14,181 women who received the supplementary foods were examined, some were discarded on account of essential facts having been left out and others were excluded because no records of controls had been sent from the area. The results from the remaining 11,618 cards are discussed below.

Effect on the child.—The stillbirth-rates and neonatal deaths for the fed and control groups are set out in table II. This shows a reduction of the infant death-rate in favour of the marmite-yeast group which is statistically significant.[3] The combined figures for England and Wales are striking, the likelihood of the difference arising by chance being less than 1 in 1300. However, the statistics upon which table II is based are not homogeneous, since the groups are compiled from four classes, subject to different rates of mortality. This is clear from an examination of table III which

TABLE II—INFANT MORTALITY. (COMBINED NEONATAL AND STILLBIRTH RATES)

Group	Cases	Deaths		Difference between death-rates per 1000 in favour of fed class	Minimum difference statistically significant
		Number	Rate per 1000		
England—					
Marmite-yeast cases	5364	297	55·4	10·6	9·5
Controls	4392	290	66·0		
Minadex cases ..	2457	140	57·0	7·7	13·6
Controls	2760	179	64·7		
Wales—					
Marmite-yeast cases	3797	249	65·6	19·2	14·0
Controls	2760	234	84·8		
England and Wales combined—					
Marmite-yeast cases	9161	546	59·6	13·7	8·1
Controls	7152	524	73·3		

3. A result is considered as "significant" only when it would be produced by chance alone on fewer than 1 in 20 occasions.

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TABLE III—INFANT MORTALITY ACCORDING TO PARITY OF MOTHER

Group	PRIMIPARÆ					MULTIPARÆ				
	Number of cases	Deaths		Difference between death-rates per 1000 in favour of fed class	Minimum difference statistically significant	Number of cases	Deaths		Difference between death-rates per 1000 in favour of fed class	Minimum difference statistically significant
		Number	Rate per 1000				Number	Rate per 1000		
MARMITE-YEAST										
England—										
Fed	1137	67	58·9	10·4	20·0	4227	230	54·4	9·6	12·0
Controls	1673	116	69·3	(P, 1 in 3·4)		2719	174	64·0	(P, 1 in 9)	
Wales—										
Fed	849	57	67·1	26·4	25·2	2948	192	65·1	11·2	17·0
Controls	1365	127·6	93·5	(P, 1 in 27)		1395	106·4	76·3	(P, 1 in 5·5)	
England and Wales combined—										
Fed	1986	124	62·6	17·6	15·6	7175	422	58·8	9·3	9·7
Controls	3038	243·6	80·2	(P, 1 in 41)		4114	280·4	68·1	(P, 1 in 19)	
MINADEX										
England only—										
Fed	351	18·2	51·8	13·0	30·0	1468	95·8	65·3	−3·0	—
Controls	787	51	64·8	(P, 1 in 2·5)		1428	89	62·3		

In this table cases from one minadex area have been excluded because the parity of a proportion of the deaths was unknown. The decimal place is due to the fact that parity could not be traced in a very small number of cases and these were therefore distributed proportionately to the different groups. P = probability.

shows the neonatal and stillbirth-rates of the fed and control classes divided according to parity. From this table two facts appear: (*a*) the proportion of primiparæ among the controls is definitely higher than among the fed cases; and (*b*) the proportion of controls in the Welsh areas is slightly lower than in the English areas. While the effect of (*a*) will be to overstate, in the combined tables, the mortality of the control group as compared with that of the fed group, the effect of (*b*) will on the contrary be to understate the mortality of the control group.

Application of the various rates of table III to fed and control populations containing Welsh and English mothers, primiparæ and multiparæ, in equal proportions, shows, however, that in the crude rates of table II the error is almost negligible.

The mortality-rates for the fed and the control groups are shown in relation to parity as well as geographical area in table III. Here the groups are necessarily smaller and the difference in favour of the marmite-yeast group, though present in all groups, is not always significant. There are, however, three points of interest: first, the stillbirth and neonatal mortality is higher in the Welsh than in the English areas in both primiparæ and multiparæ; secondly, the effect of the marmite-yeast supplement is greater when the initial mortality is high (this greater improvement in districts having a high mortality is shown in table IV); and thirdly, when

TABLE IV—STILLBIRTH AND NEONATAL DEATH-RATES IN WOMEN ATTENDING ANTENATAL CLINICS (COMBINED)

Town	Control class per 1000	Fed class per 1000	Difference
Rhondda	96	66	30
Monmouth	84	62	22
Newcastle	71	56	15
Durham (yeast area)	63	55	8

the stillbirth and neonatal mortality is high, as in the Welsh areas, there is a large difference in the mortality-rates of the primiparæ and multiparæ in the control groups, but this difference is much reduced by the marmite-yeast supplement, the difference in the fed groups being only 2 per 1000, whereas in the control group it is 17·2 per 1000.

Effect on the mother.—When the investigation was started it was expected to continue for several years, so that a sufficient number of cases and deaths could be obtained for statistical analysis. Unfortunately, the grant from the Treasury was discontinued earlier and the work had to cease 21 months after controlled conditions had been introduced. It is, therefore, very difficult to assess the effect of supplementary feeding on maternal mortality owing to the small number of maternal deaths in the limited series studied. Further, in comparing the results obtained in the present investigation with those published earlier by the Birthday Trust it must be remembered that during the years 1937–38 sulphonamides came into general use in cases of puerperal sepsis and the maternal mortality as a result fell considerably. Table V shows that in some groups there is a lower mortality-rate in the fed cases, but not in all, and in no group is the difference in the rates significant.

TABLE V—MATERNAL MORTALITY

Group	PRIMIPARÆ			MULTIPARÆ		
	Cases	Deaths	Rate per 1000	Cases	Deaths	Rate per 1000
MARMITE-YEAST						
England—						
Fed	1137	4	3·5	4227	5	1·2
Controls	1673	3	1·8	2719	6	2·2
Wales—						
Fed	849	2	2·4	2948	15	5·1
Controls	1365	11	8·1	1395	7	5·0
England and Wales combined—						
Fed	1986	6	3·0	7175	20	2·8
Controls	3038	14	4·6	4114	13	3·2
MINADEX						
Fed	478	..	..	1979	6	3·0
Controls	985	4	4·0	1775	5	2·8

Effect of different food supplements.—Only the stillbirth and neonatal mortality figures will be considered under this heading, since the number of maternal deaths is too small to make a detailed analysis of the maternal mortality figures of value. When the figures were examined it was found that those of the marmite and yeast groups were practically identical. This finding was not unexpected since both preparations were made from brewers' yeast by a similar process, and were rich sources of the vitamin-B complex. These two groups were, therefore, combined and considered as a marmite-yeast group. Minadex was not given in the Welsh areas. The reduction in the mortality figures in the group receiving the marmite-yeast supplement in comparison with the figures for the controls is statistically significant in England and Wales and in the combined areas, but though there is a reduction in the mortality-rate in the minadex group over its control, this figure is not significant (table II). Unfortunately, the number of women receiving minadex was small, so that it is difficult to assess the importance of these findings. This difference in favour of the marmite-yeast supplement in comparison with the minadex supplement was

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probably not due to any difference in the mortality-rate from one area to the next, since in County Durham, where the two supplements were given in the same area, the same difference in favour of the marmite-yeast supplement was observed. It is probable that had the two supplements been combined the reduction in the stillbirth and neonatal mortality-rate might have been even more striking.

Incidence of toxæmia.—An attempt was made to assess the incidence of toxæmia among the fed and control groups, and for this purpose all deaths, either maternal, neonatal or stillbirths, where toxæmia was named as a primary or contributory cause of death, were classified together as deaths due to toxæmia. The incidence of toxæmia thus defined is set out in table VI which shows:

1. The toxæmia mortality is definitely higher in Wales than in England.
2. The toxæmia mortality is higher for the primiparous than for the multiparous group.

TABLE VI—TOXÆMIA MORTALITY

Group	PRIMIPARÆ			MULTIPARÆ		
	Cases	Deaths		Cases	Deaths	
		Number	Rate per 1000		Number	Rate per 1000
England—						
Fed cases ..	1615	4	2·5	6206	12	1·9
Controls ..	1987	8	4·0	3348	10	3·0
Wales—						
Fed cases ..	849	10	11·9	2948	18	6·1
Controls ..	1365	13	9·5	1395	14	10·0
England and Wales combined—						
Fed cases ..	2464	14	5·6	9154	30	3·3
Controls ..	3352	21	6·2	4743	24	5·1

DISCUSSION

The analysis of the records set out in the tables shows that supplementary feeding with marmite, or a similar yeast extract, during pregnancy results in a statistically significant reduction in the stillbirth-rate and neonatal mortality. The records also show a reduction in the maternal mortality-rate which is suggestive but not statistically significant. The figures for the stillbirth-rate and neonatal mortality are fully adequate since a large number of cases and deaths were observed. The maternal deaths, however, were few, in spite of the large number of cases.

Similar results are reported by Ebbs et al.[4] who investigated the influence of prenatal diet on mother and child in Toronto in 1941. These workers, in a series of carefully controlled cases, showed that women on good diets, or receiving supplementary foods, had fewer complications during pregnancy and labour than women on a poor diet, and that the incidence of miscarriages, stillbirths and premature births was less in the well-fed than in the poorly-fed women. The neonatal mortality was also less in the infants of the well-fed women than in those of the poorly-fed.

The People's League of Health[5] has also reported on the effect of a well-balanced diet during pregnancy on the health of the mother and child. The report shows that supplementary feeding protected the mothers against the risk of toxæmia in a ratio of about 30% and also reduced the number of premature births, the reduction being statistically significant.

In a dietetic survey in Bombay in 1932, Balfour and Talpade[6] showed that women on diets containing whole wheat or millet—both, like yeast, good sources of the vitamin-B complex—had fewer premature infants than women whose diet consisted largely of polished rice. The neonatal death-rate was higher in premature infants than in full-term infants and, therefore, higher among the children of the mothers on a diet consisting largely of milled rice than among the children of the mothers on a diet containing appreciable amounts of whole wheat and millet.

The mortality-rates for the Welsh areas are all higher than those of the English ones, but the reduction in the mortality-rates as a result of supplementary feeding is greater in the Welsh than in the English areas. It is worthy of note that some at least of the Welsh areas had a larger percentage of insured persons to the total population than was the case in the English areas. It is also a fact that owing to the scattered nature of many of the areas, it was difficult for women to attend antenatal clinics regularly and medical aid was not necessarily always immediately available. Such factors, and probably many others, must have adversely affected the healths of the women in the Welsh areas and possibly explain the higher mortality figures.

The records of the investigation are stored at the office of the National Birthday Trust Fund, 57, Lower Belgrave Street, S.W.1, and may be seen if desired.

4. Ebbs, J. H., Tisdall, F. F., Scott, W. A. *J. Nutrit.* 1941, **22**, 575.
5. Interim Report of People's League of Health, *Lancet*, 1942, ii, 10.
6. Balfour, M. I., Talpade, S. K. *Indian Med. Gaz.* 1932, **67**, 601.

SUMMARY

In a feeding experiment covering 10 areas in the North of England and 18 in South Wales, 11,618 pregnant women received food supplements consisting mainly of vitamins A, D and B-complex, and calcium, phosphorus and iron. They were compared with 8095 pregnant women who received no such supplements. Both classes were getting extra milk in some form.

There was a significant reduction in the stillbirth and neonatal mortality-rates of the fed group as compared with the controls.

Maternal deaths in the series were too few for any conclusions to be drawn.

My thanks are due to the Research Committee of the National Birthday Trust Fund who have kindly consented to the publication of this paper, to Dr. Percy Stocks for assistance in the classification of maternal deaths, to Mr. J. Plymen, FIA, for his kindness in undertaking the statistical analysis and answering my every question, to the medical officers of health of the areas and to their staffs whose coöperation made the work possible, and especially to Lady Rhys Williams, to whose initiative and energy the whole enterprise was due.

ADOLESCENT KYPHOSIS

T. J. B. A. MACGOWAN, CHM GLASG, FRCS, FRCSE
WING-COMMANDER RAFVR; ASSISTANT SURGEON TO OUT-PATIENTS, GLASGOW ROYAL INFIRMARY

BEFORE considering the question of adolescent kyphosis, I shall briefly summarise the anatomy and physiology of the spine.

The intervertebral disc is an elastic plate containing a central nucleus which, being an incompressible nodule, acts as a ball-bearing through which the weight of the body is transmitted from vertebra to vertebra in all postures and movements. The disc itself is a shock-absorber which, while retaining the nucleus in position, cushions the movement of the vertebral bodies. The vertebræ are fitted with hard bony surfaces normally preventing any diffusion of the vertebral nucleus.

The axis of motion and weight-bearing is always in the region of the nucleus, and when the nucleus is destroyed (as may happen in various ways) the accident causes movement to take place through the posterior vertebral joints; an anterior shift of weight-bearing results when the vertebral column is flexed. The anterior borders of the vertebral bodies will then be subjected to increased stress, which in flexion will be a pressure strain.

The vertebral body develops from ossification centres, two in the body and two, situated one at each articular surface, commonly called the ring epiphyses. Studies of the bone laid down by these various centres show that the ring epiphyses are responsible for the lower and upper surfaces of the vertebral body, besides completing the anterior surface.

THE MECHANICS OF KYPHOSIS

I think that in every case of adolescent kyphosis the vertebral nucleus is destroyed before the ossification of the vertebral body is complete. This destruction may be caused by failure of the cartilaginous disc to

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retain the nucleus, or by softening of the vertebral body which allows the nuclear tissue to prolapse into the soft vertebral body. As soon as this happens the weight-bearing function is transferred to the bodies anteriorly, and the axis of motion to the posterior vertebral joints; increased pressure results at the anterior borders of the vertebral bodies when the spines is in flexion. If the patient is adolescent, the epiphysis will be subject to trauma. Abnormal ossification follows, leading after a period of increased growth to premature closure of the epiphysis, failure of anterior vertebral ossification and wedge formation of the vertebral bodies (figs. 1–5).

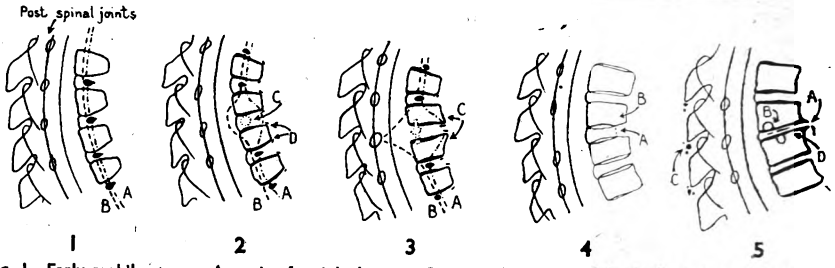

Fig. 1—Early mobile stage. A=axis of weight-bearing, B=axis of motion. Spine in flexion, nuclei subject to constant pressure backwards.
Fig. 2—Late mobile stage. Axis A shifting anteriorly and axis B posteriorly. C=nucleus prolapsing, D=epiphyses, now visible.
Fig. 3—Early rigid case. C=early proliferation of bone due to shifts of axes A and B.
Fig. 4—Rigid stage. A=reduced disc area in affected area, B=bone formed by bony centres of ossification.
Fig. 5—Rigid arthritic changes; degenerative changes. A=anterior spurs, B=nuclear bony envelopes, C=calcification in posterior ligaments, D=calcified area in disc.

As time goes on, the wedge-shaped bodies develop spurs round the anterior angles. These spurs may join, forming an anterior bridge of ossification. The degenerate nucleus and disc may also share in this ossification and become opaque in an X-ray examination. All these changes can be seen in the series of X-ray plates made during the course of the disease in children aged 6 to adults who have reached the stationary and final stages.

The cause of the original prolapse is important in the study of the deformity, because this is the start of an identical series of changes in the vertebræ, no matter what the clinical type; and the ratio of forces applied to resistance of the spine is the essential point to consider in ætiology.

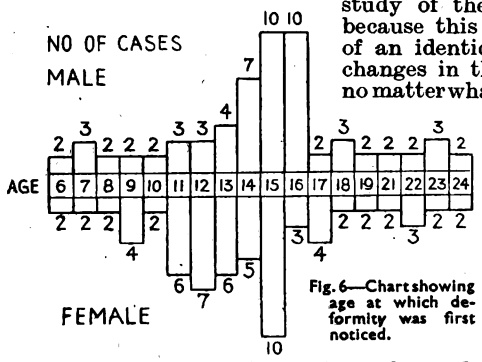

Fig. 6—Chart showing age at which deformity was first noticed.

The basic clinical appearances in the 5 types have been described elsewhere. The types have an identical radiological picture, but the classification depends on the difference in physique or spinal resistance and the different loads applied to the spine. The original description of the condition by Scheuermann is well known; he saw it as an "epiphysitis" and a manifestation of osteochondritis, a disease showing in all cases irregular ossification processes during the period of maximum skeletal growth. In our series the youngest patient was a boy aged 6, the oldest a man aged 45, the disease having started at the ages of 5 and 22 respectively. Fig. 6 shows the age at which deformity was first noticed in this group of cases, and it is interesting to note that the commonest years for its start are those of maximum spinal epiphyseal growth, and the earlier onset in females, a fact consistent with the earlier appearance and closure of the vertebral epiphyses in girls. It is difficult to correlate the age of the patient at the onset of the disease, the site of maximum curve, and the state of his epiphyses: but it is probable that the long regular curve with the peak at the sixth dorsal vertebra occurs in a child most of whose epiphyses have recently appeared and are all actively growing (fig. 7). Assuming that the vertebral bodies are of normal strength, this state of affairs would be found in the spine of a girl aged 12 or a boy aged 14, and would be caused by the prolapse of many nuclei and the consequent disturbance of many ring ossification centres.

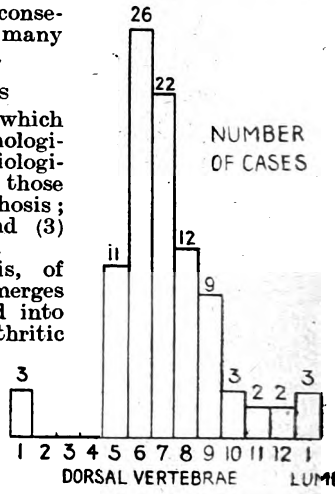

Fig. 7—Site of maximum curve.

TYPES OF KYPHOSIS

The basic types into which all patients fit in a pathological, as opposed to an ætiological, classification, are those with: (1) mobile kyphosis; (2) fixed kyphosis; and (3) fixed arthritic kyphosis.

The mobile stage is, of course, the earliest and merges after a variable period into the fixed, and fixed arthritic stages. The factors which affect the mobility will be discussed later. The child, usually between the ages of 6 and 12, has been described by the parents to stand with a stoop, prominent abdomen, or cervical protrusion. The diagnosis may vary from ascites to goitre—depending on the site of the protuberance. The muscles vary in their development and there is no constant type of person affected, some being precociously developed, others subnormal in size and musculature. Muscular incoördination is common, and when standing, the kyphosis is evident, masked to a greater or lesser extent by lumbar lordosis. The kyphosis can be corrected, as can the lumbar lordosis, by voluntary effort for a short time. By making a tracing of lead tape laid over the curve the degree of correction obtained can be demonstrated. To discover the relation between mobility and the duration table I was compiled.

The question of hamstring shortening has been considered, because tightening of the posterior thigh muscles contributes to the formation of kyphosis. When the back is used as a flexible lever, acting with the hip-joints as a fulcrum to stretch tight hamstrings, damage to the dorsal spine will result. This may develop in such cases during toe-touching exercises, where the child is encouraged to touch the ground in a series of jerks with his legs straight (Lambrinudi). With this in mind table II was prepared, in which

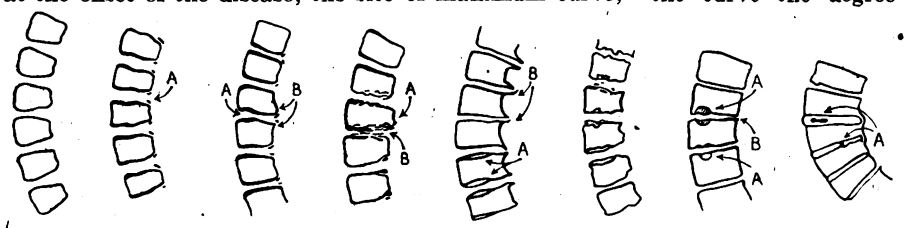

Fig. 8—Early mobile kyphosis correctable by manipulation. (Patient aged 6.)
Fig. 9—Mobile kyphosis. Change of nuclear position; intervertebral spaces larger posteriorly. A=epiphyses, now visible. (Patient aged 12.)
Fig. 10—Fixed kyphosis. A shows where nuclei have prolapsed leaving thinned disc area. B=vertebral bone proliferation. (Patient aged 13.)
Fig. 11—Fixed kyphosis. A=anterior vertebral growth disturbed, leaving projections of vertebral bodies. B=irregular epiphyseal growth and thinning of intervertebral disc. (Patient aged 14.)
Fig. 12—Rigid arthritic kyphosis. A=reduced disc areas. B=spurs of bone. (Patient aged 32.)
Fig. 13—Rigid kyphosis. More severe changes.
Fig. 14—Rigid kyphosis. A=nuclear envelopes, B=thinned discs. (Patient aged 18.)
Fig. 15—Rigid arthritic stage. A=calcification of discs.

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TABLE I—DURATION OF CURVATURE AFTER FIRST SIGN

Duration of curvature (years)	Cases	Fixed	Mobile
Under 1	11	..	11
1	19	13	6
2	9	8	1
3	4	4	..
4	2	2	..
5	3	3	..
Over 5	14	14	..

mobile and rigid cases were classified to assess the degree of hamstring tightness.

The kyphosis is a smooth regular curve, but varies with the lumbar lordosis, which may mask the curve. Scoliosis may be present, and may be associated with unequal hamstring shortening. Secondary cervical

TABLE II—HAMSTRING SHORTENING IN 62 CASES

Type of kyphosis	Cases	Tight hamstrings	Normal hamstrings
Mobile ..	18	12 (66%)	6 (33%)
Rigid ..	44	31 (70·7%)	13 (29·3%)

lordosis develops later and is considerable in the late stages. In the rigid type several new features are added. The spinous processes are prominent and are flanked by the two columns of spinal muscles, usually fairly well developed; absolute rigidity is present in the affected area of dorsal spine, and no immediate correction, voluntary or passive, is possible. Rigidity of the cervical spine, due to the fixation of the compensatory lordosis of this region, is also seen. As soon as this deformity occurs the muscular and ligamentous balance is upset and the bones are then pulled over into lordosis position incorrectable by the extensor muscles of the neck which have now no mechanical advantage.

Secondary scoliosis was found in 27·2% of cases in this series, taking the form of a long rigid curve, dorsal or dorsi-lumbar curve, with secondary curves above or below. Tenderness is seldom found on direct palpation of the spinous processes, but if the patient is allowed to jump from a height of a few feet, an unpleasant jar in the spine is experienced, probably due to the thinning and immobility of the discs, and the absence of the nucleus; the rigidity also contributes to the pain by preventing protective adjustments in the position of the trunk.

The blood of several representative patients was analysed, samples were collected from the following types: mobile type (short duration); fixed type

TABLE III—BLOOD CHEMISTRY

Case no.	Urea	Chlorides	Phosphates	Non-protein nitrogen	Calcium	Phosphatase units
	mg. %					
1	25	620	4·6	36	8·6	6·7
41	29	560	4·3	33	8·2	3·3
42	26	575	4·3	34	7·9	5·6
69	27	602	5·0	33	9·9	6·4

(short duration); fixed type (long duration); post-traumatic type with arthritic changes.

In no case was there any gross deviation from normal in the quantities of organic or inorganic elements of the serum or corpuscles (table III).

CLINICAL TYPES

Other writers agree that the disease is found almost entirely in boys. My own findings are different. From a review of 100 cases I have come to the conclusion that the patients can be divided into 5 types on an ætiological basis:

1. Thin asthmatic "debilitated" children. External forces normal; decreased spinal resistance.
2. Fat overgrown "endocrine" or gigantic type. External forces normal; spinal resistance decreased.
3. "Congenital" type. External forces normal or increased; spinal resistance decreased.
4. Tall well-built precociously muscled "apprentice" type. External forces increased; spinal resistance normal.
5. Traumatic type, where the deformity follows an accident causing excessive strain on the spine, not sufficient to cause fracture of the body of the vertebræ. External forces increased; spinal resistance normal.

A typical child in the first group (*debilitated type*) is the thin, poorly developed boy who has been the subject of chronic chest disease and whose skeleton is probably poorly calcified.

The second (*gigantic type*) is presumably the possessor of a long, thin, poorly supported spine, unable to cope with normal stress. There may be some skeletal ossification defect, possibly from pituitary deficiency. These people usually measure 6 ft. 3 in. or more even when the curve is not straightened.

In many families there is a history of inherited kyphosis (*congenital type*). Five families were seen in which adolescent kyphotic changes had been noted in three generations. This would accord with the theories which postulate that congenital tears and weaknesses in the intervertebral discs and in neighbouring parts of the vertebral body might provide an easy way for the prolapsed nuclear material to enter the substance of the vertebral body.

The well-muscled *apprentice type* is usually the lad sent to work in an occupation where his well-built look leads his employer to give him work which is too heavy. The additional strain is sufficient to cause prolapse of the nuclei, several vertebræ usually being affected; the kyphosis shows the smooth, regular curve characteristic of this type.

The *traumatic type* is found in cases with a definite history of injury followed by the development of a kyphotic curve and the usual radiological changes of the condition. Of a series of older men, whose spinal arthritis was investigated late in life, 3 had been blown up in the trenches and suffered forced flexion of their vertebral column. Since the injury was sustained during the years of spinal growth and the present X-ray pictures were those of old arthritic adolescent kyphosis, it is reasonable to think that injury has a definite place in the ætiology.

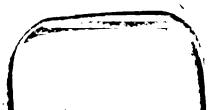
OSSIFICATION OF THE SPINE

Before studying the X-ray appearances it is essential to fix in our minds the method by which ossification of the vertebræ is completed. Until lately there have been two schools of opinion regarding the function of the ring epiphysis lying above and below the vertebral bodies. The first says that this epiphysis is a growth organ and responsible for the formation of the upper and lower areas of the vertebral body. The other regards this epiphyseal area as a disc fixation organ. Lately studies in bone growth using radio opaque chemicals have shown that the former view is probably correct. Accepting this hypothesis, it will be seen that any interference with growth in the ring area will result in disordered bone-formation and deformity of the vertebral body and a wedge-shaped bone, the smaller end towards the front—while if the damage is mainly lateral the wedging will be from side to side. In adolescent kyphosis the main stress will be at the anterior region, and most cases will therefore show a pure kyphosis, but in a certain number of cases there has been a lateral strain and an element of scoliosis is added.

X-RAY APPEARANCES

The appearance of the spine at various ages is not well known and is subject to so much variation that it is difficult to lay down a standard. From X-ray plates of normal spines at various ages I have tried to give an average description for each period.

At birth the osseous vertebra is spool-shaped in profile, the relation between the vertebral shadow and the intervening



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clear areas being 1:4 (in the normal adult 1:5). The intravertebral notches are filled in between the ages of 1 and 2, the body then becoming roughly oval in shape with smooth flat upper and lower surfaces, the relation of clear to dark areas being 1:4. At the age of 7 the upper and lower anterior angles of the body are notched, giving a staircase appearance to the anterior surfaces of the bodies viewed in profile.

The epiphyseal rings appear at the age of 10 as small osseous granules lying in this right-angled clear area, and gradually increase in size. Dense shadows above and below the vertebral bodies show the presence of the ossification plates. The surface of the bodies is still flat on the disc side, except at the extreme anterior end. At this time in some spines a deep notch or cleft of the body can be seen midway between the epiphyseal shadows. It corresponds to the site of the horizontal venous channel of the body which at this active period of growth is enlarged to meet the requirements of the developing bone. At the age of 13 the epiphyses are seen as one homogeneous plaque on each side of the intervertebral disc which is now a perfect rectangle with a suggestion of convexity in the region of the nucleus. Between the ages of 18 and 25 the discs, which present a clear area, have a height ratio to the bodies of 1:5, the boundaries being sharply demarcated by the edges of the vertebral bodies. The vertebræ themselves are uniform in texture and rectangular in shape.

Oblique photographs by the technique of Junghanns give a clear picture of the epiphyseal ring—his "oval images."

The limitations of radiological examination must be appreciated. Many workers are under the impression that the absence of abnormal appearances means there are no anatomical or pathological changes. This is particularly evident in examples of nuclear prolapse; a macerated specimen with gross naked-eye destruction of the vertebral body, when radiographed, may show no sign of the abnormality, for only when a protective shell of compact bone is present is there a clear picture of a prolapse. In the body the problem is complicated by the difficulty of technique necessary in the radiological diagnosis of dorsal spine lesions.

Figs. 8–15 show stages in the development of a kyphosis.

In the early mobile stage, the deformity, being correctable, is mainly a soft tissue defect; the spine is held at the limit of flexion but extension is still possible; in the late mobile stage this extension is less and bony changes are occurring without much radiological change. Probably at this stage nuclear prolapses have followed nuclear displacement, under the continued flexion strain. If the epiphysis appears, it will be now subject to a trauma, growth of bone will be disordered, and by the early rigid stage, we shall see radiological changes in an area of vertebral body which, if measured on the adult, would be in the region of the junction of the anterior third and posterior two-thirds of the vertebral end plates. In the late rigid stage wedge-shaped bodies are the rule, owing to the continued growth of the body centres, and a process of modelling which flattens out the step between the arrested end plates and the projecting area of bone formed by the body centre.

Nuclear prolapses, if they are radiologically visible, must be surrounded by a shell of compact bone. They are therefore seen at a late stage and are always seen in the area of the nucleus, or posterior to that region. It is difficult to say how a prolapse could occur in the anterior two-thirds of the vertebral body because the nucleus is always bent backwards or posteriorly in flexion stress. The large gaps and "moth-eaten" areas seen in several cases of kyphosis about the age of 14–15 are due to disordered epiphyseal growth causing failure of bone formation.

In the late arthritic stage the ordinary degenerative changes include thinning of and ossification or calcification in the vertebral discs, formation of anterior vertebral spurs, ossification in the posterior ligaments and ossification or calcification in the soft tissues in or around the vertebral disc.

Fig. 8 was drawn from a radiogram of the lateral dorsal spine of a boy aged 6, in which all the changes are ligamentous and nothing is seen radiologically except the presence of kyphosis. At this stage the nuclei will be under pressure, probably forced backwards, and in a short time the appearances will be those shown in fig. 9. Here the vertebral bodies are separated by wedge-shaped discs broader posteriorly. With this altered axis more weight will fall on the anterior areas of the vertebral body and bone motion will be felt excessively in the same place from the fact that the axis of motion moves posteriorly. The ring epiphyses, which are visible in this plate as small granules, are flat densely calcified areas above and below the vertebral body, and will be subject to nuclear strain resulting in the first place in the appearance shown in fig. 10. Here we see two areas of bone formation, causing a projection of the vertebræ, which will probably be followed by early closure; the amount of bone ultimately laid down will be relatively small. Meanwhile, the central growth of the body still continues and wedging will occur. This arrest of the end-plate can be seen in fig. 12, where the disc area is relatively small. Some of the changes due to disorganised growth and ossification in the epiphyseal area are seen in figs. 11 and 13, where large gaps and areas of hypercalcification and rarefication give the well-known appearance usually labelled osteochondritis. The appearance of bone-modelling which then goes on is seen in fig. 12. The vertebral body is wedge-shaped; the disc area is restricted and thin spurs are growing into the anterior vertebral ligament. More severe changes are shown in fig. 13. No nuclear prolapses are visible, but in fig. 14 hard bony envelopes can be seen in the region of the nucleus. Calcification of the disc can be seen in a further example of a long-standing kyphosis in fig. 15.

SUMMARY

If the vertebral nucleus is destroyed before ossification of the vertebral body is complete, the axis of weight-bearing is transferred anteriorly and the axis of motion posteriorly; as a result the vertebræ become wedge-shaped and develop spurs anteriorly.

The mobile stage of kyphosis merges into the fixed, and thence into the fixed arthritic stage.

Cases of kyphosis can be classified on an ætiological basis as: asthmatic, endocrine, congenital, "apprentice," and traumatic types.

The X-ray appearances of the normal spine at various ages and of the kyphotic spine at various stages are illustrated.

I should like to thank Mr. Rocyn-Jones, Mr. V. H. Ellis and Mr. Blundell Bankart for allowing me to describe these cases under their care at the Royal National Orthopædic Hospital.

RHESUS ANTIBODY IN Rh-POSITIVE MOTHER

CAUSING HÆMOLYTIC DISEASE OF NEWBORN

A. J. McCALL, M D LPOOL, M R C P
PATHOLOGIST, NORTH STAFFORDSHIRE ROYAL INFIRMARY

R. R. RACE* M R C S

G. L. TAYLOR* M D MANC, PH D CAMB, M R C P

Galton Laboratory Serum Unit, Dept of Pathology, Cambridge

IN three large series of cases, involving 251 mothers (Levine et al. 1941, Boorman et al. 1942, and Race et al. 1943b), it has been found that 90% of the mothers of babies suffering from hæmolytic disease of the newborn (erythroblastosis fœtalis) are Rh-negative, and that the sera of a large proportion of these Rh-negative mothers contain an antibody to the Rh factor. Whenever it has been possible to test the blood of an affected child of an Rh-negative mother the child has been Rh-positive.

In the 10% of cases where the mother is Rh-positive there is some evidence that other antigens, such as those of the A-B-O system and its subgroups, have sometimes been involved. On rare occasions hæmolytic disease has been caused by an Rh-positive mother making a sort of anti-Rh which agglutinates the red cells of all Rh-negative and some Rh-positive persons. One such case was found by Levine, Javert and Katzin, who named the serum anti-Hr (Rh reversed). This serum was evidently troublesome to work with because different accounts (Levine 1941, Levine et al. 1942, and Wiener 1942, 1943) have given the frequency of positively reacting bloods as about 30% and as 50%.

* Working on behalf of the Medical Research Council.

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We now describe a case of hæmolytic disease where the mother was Rh-positive and yet had in her serum an antibody similar to, but not identical with, anti-Hr. (Mention of this serum was made by Race and others 1943b.) This serum, which we have called St, reacts with the blood of 80% of people including all the Rh-negatives, all the heterozygotes (Rhrh) and some of the homozygous Rh-positives (RhRh). These reactions are now known to be due to the presence in the red cells of factors determined by allelomorphs of the Rh gene. By using St and other forms of anti-Rh sera it has proved possible to determine serologically the genotype of about 80% of people (see Race and Taylor 1943, Race et al. 1943a, 1944).

CASE-HISTORY

A male infant, aged 14 days, was admitted to the North Staffordshire Royal Infirmary under the care of Dr. J. Lindsay Boyd on Jan. 31, 1943. Increasing jaundice had been noticed since the second day, and the stools and urine were deeply bile-stained. Nutrition was fair; there was well-marked pallor and deep jaundice, and the liver was moderately enlarged. A blood-count showed Hb 55% (9 g. per 100 ml.), red cells 2,500,000 per c.mm., CI 1·1, mean diameter of red cells 8·1 μ, white cells 15,000 per c.mm. Anisocytosis and polychromasia well marked; 300 normoblasts per c.mm. The blood was group O, Rh-positive.

On Feb. 2 the hæmoglobin had fallen to 42%. The mother was not available at this time, and 150 ml. of Rh-negative group-O blood was given in divided amounts throughout the day. When the mother's blood was later examined, it was found, contrary to expectation, to be Rh-positive, and her serum contained a powerful agglutinin which acted on the cells of the Rh-negative donor used and an additional 12 unselected group-O bloods which happened to be available; agglutination occurred at room temperature but was stronger at 37° C. No agglutinin for any of these cells was found in the child's serum.

On Feb. 8 the child was removed from hospital with Hb 68%. He was readmitted on the 13th with Hb 46%. Examination of 20 group-O bloods disclosed 3 which failed to agglutinate with the mother's serum either at room temperature or at 37° C. Two transfusions on consecutive days totalling 200 ml. from one of the St-negative group-O donors raised the hæmoglobin to 79%. This level was maintained, and the child was discharged free from jaundice on March 13, 1943.

It appeared that the St-negative blood survived longer than the St-positive blood that was given at the first transfusion. The mother, who suffered from a severe hypochromic anæmia aggravated by postpartum hæmorrhage, was transfused with 600 ml. of St-negative group-O blood without reaction.

FAMILY HISTORY AND BLOOD GROUPS

The mother had had no stillbirths or abortions.

Eldest son: Born 1939. Healthy child, no history suggesting erythroblastosis. Blood groups O N. Rh+, St+, P−. (Rh_1rh.)†

2nd son: Died on admission to hospital from erythroblastosis, August, 1941. No investigations were made.

3rd son: History given above. Group O MN. P−, Rh+, St+. (Rh_1rh.)†

Mother: Group O MN. P−, Rh+, St−. (Rh_1Rh_1.)†

Father: Group A_1MN. P(?), Rh+, St+. (Rh_1rh.)†

Rh_1 and Rh_2 are members of the allelomorphic system mentioned above. The antigen corresponding to Rh_1 fails to react with St serum, and the father and living children (all Rh_1rh) are St-positive owing to the presence of the recessive gene rh. The gene rh was, however, absent from the mother (Rh_1Rh_1) so that isoimmunisation of the mother by the child's rh antigen was possible, and actually occurred. It has been found that St invariably reacts with rh, even when this gene occurs in heterozygous Rh-positive persons; it also reacts positively with Rh_2 and the explanation of this is not clear on the basis of the antigenic relationships shown above.

SUMMARY

Clinical details and history are given of a family in which hæmolytic disease of the newborn has been caused by a rare type of Rh antibody. This antibody has proved of fundamental importance in the recognition of allelomorphs of the Rh gene and the resulting genotypes.

We are indebted to Dr. J. Lindsay Boyd for placing his clinical notes at our disposal.

† The Rh genotype in the allelomorphic system mentioned above.

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Medical Societies

ASSOCIATION OF INDUSTRIAL MEDICAL OFFICERS

AT a meeting of the association on Jan. 22, with Dr. J. C. BRIDGE, the president, in the chair, a discussion on

Injuries, Infections and Burns of the Hand

was opened by Mr. R. M. HANDFIELD-JONES. He stressed the vital importance to the industrial worker of injuries and infections of the hand. A trivial accident might, if not properly treated, lead to catastrophe. The commonest minor injuries affected the distal segment of the finger. Owing to the division of the pulp of the finger into a series of narrow compartments by fibrous trabeculæ, drainage of a pulp infection, if it is to be effective, must open all the infected compartments at once. A pure pulp infection must be differentiated from lymphangitis. In lymphangitis incision was definitely contra-indicated; each case must be regarded as potentially fulminating, the patient must be put to bed with arm raised to 45°, kaolin poultices must be applied, and massive doses of sulphanilamide given. Tendon-sheath infections were serious, in that 100% return of function could never be guaranteed. Early incision was essential. Infection of the palmar spaces involved swelling and tenderness of the palm. The swelling in the case of the middle palmar space is not so noticeable as the ballooning which occurs with infection of the thenar space. These infections were usually caused by spread from others, and rarely by direct infection. Patients with injuries of the hand, especially compound fractures, should be treated as inpatients. When the wounds had been cleaned they should be filled with sulphanilamide powder, loosely stitched and subjected to some form of traction. Early active movements were essential, it was much easier to avoid a stiff joint than to loosen a joint which had been allowed to become stiff. Position in treatment was often important. The œdema could be minimised by raising the arm on a wooden frame; having it lying on a pillow was not enough. If a stiff joint appeared inevitable, the hand should be kept in the proper position for function, for stiffness in an unsuitable position gives an unsightly and useless hand. By suitable splinting support and the intelligent use of elastic traction, deformities and stiffness of joints might be avoided.

Dr. P. H. JAYES said there had been much discussion and argument about the right way of treating burns of the hands. The treatment to be adopted depended, of course, on the facilities available and the nature of the case. As a general rule burns of first or second degree did not give much trouble and whatever treatment was adopted full function usually resulted. It was with third degree burns of the hands that problems were encountered, particularly where the burns extended over a wide area. With these, skin-grafting was very often necessary to attain a full functional result. As a rule coagulants did not give the best results on account of the constriction of the fingers and the consequent interference with blood-supply caused not only by the coagulum but by the œdema commonly present beneath

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it. The coagulum was often so stiff that it splinted the finger for many weeks, and the stiffness was difficult to overcome at a later stage in the treatment. At East Grinstead the saline bath was used for all severe burn cases. Efforts were made to prepare denuded areas for skin-grafting at an early stage. Dressings were soaked off in the bath and the parts were exercised by active movements at the same time. After drying, the burned area was powdered with sulphanilamide and covered with tullegras with a moist saline compress over it. Most cases were skin-grafted by the end of 3 weeks. It was important, if successful results were to be obtained from the grafting, to be sure that the denuded area was free from hæmolytic streptococci. In cases where the swab was positive, grafting was postponed and efforts made to sterilise the skin by the use of local sulphanilamide and propamidine. Dr. Jayes urged that the hand must be kept moving while waiting for grafting. If joints had been opened and stiffness seemed almost inevitable, the joint must be kept in the position of election for optimum function. Cases seen at a late stage with contractures due to tight scars could often be improved by dissecting away the scar and replacing it by Thiersch grafts. In some cases a full-thickness skin-graft from the abdomen was necessary. First-aid treatment for burns should be as simple as possible, and in many cases covering with a sterilised dressing was sufficient. At hospital the area was carefully cleaned up under aseptic conditions; 'Cetavlon' detergent solution was used for this. Blisters and loose skin were trimmed away, and the whole of the area covered with sulphanilamide powder, tullegras and a saline compress.

SOCIETY OF MEDICAL OFFICERS OF HEALTH

AT a meeting of the Maternity and Child Welfare Group on Jan. 15, with Dr. MARJORIE BACK, the president, in the chair, a paper on

Squint

was read by Mr. C. L. GIMBLETT, FRCS. He showed how the various theories of the cause of squint could not be made to fit in with the facts unless binocular vision was taken into consideration. Mr. Claud Worth had emphasised three stages of binocular vision in the squinting child—(1) simultaneous perception, (2) fusion, (3) stereoscopic vision. Mr. Gimblett described the tests used in estimating binocular vision and visual acuity, and enumerated the stages in the examination and treatment of the squinting child. In answer to questions he said that the time required for orthoptic treatment depended on the patient's progress. All cases of squint were not suitable for orthoptic treatment and it was important to select cases carefully. Rest periods were given at suitable intervals, but the young child was not discharged from the orthoptic department until he could read and be trained to accommodate properly. The ideal age for orthoptic treatment is 5–8 years but a child should be sent for examination as soon as the squint was noticed. Whether the child developed it at the breast, when teething, or when frightened by a noise, such a child should be refracted, any error of refraction should be corrected, and amblyopia thereby prevented. If the squint were neglected for two or three years, a good deal of the time spent in the orthoptic department would be taken up in improving vision in the amblyopic eye. Vision in the worse eye must be at least 6/12 before orthoptic treatment can be started.

Miss GLADYS IRVINE, senior orthoptist to the Royal Air Force, demonstrated the Synoptophore and gave each member of the audience the opportunity of using the instrument.

EXPECTANT AND NURSING MOTHER'S COOKERY BOOK, by CECILIA HOOGENDOORN, teacher of domestic subjects, LCC (Arnold. Pp. 112. 3*s.* 6*d.*), is a good little book and has been compiled to help the inexperienced with their diet and with preparation of foods. Attention to these recipes and menus would go far towards improving the health of the coming generation. Antenatal clinics should find the book useful; and it is to be hoped that the time is not far distant when those attending clinics will be able to afford the suggested menus.

Reviews of Books

Endocrine Disorders in Childhood and Adolescence

H. S. LE MARQUAND, MD LOND., MRCP, physician to the Royal Berkshire Hospital, Reading; F. H. W. TOZER, MD LOND., MRCP. (Hodder. Pp. 298. 15*s.*)

THE British school of endocrinologists, prominent in laboratory and clinical research, has been slow in the writing of books, Professor Cameron's *Recent Advances* and Dr. Simpson's small but good *Major Endocrine Disorders* being the only important works to date. A new English textbook is thus a noteworthy event. It shows evidence of great experience, not always well digested, and of keen observation, not always well set out. The battle still goes on between the old uncritical guesswork, still reproduced from textbook to textbook, and the more modern sceptical outlook. The authors do not really believe in so-called pituitary obesity: their evidence is more in favour of a disorder of the hypothalamic metabolic centres. They rightly treat their cases dietetically, but the dead hand of tradition makes them advise whole pituitary injections, which are certainly valueless, and anterior pituitary snuff, for the efficacy of which there is little evidence. In the chapter on thyropituitarism tradition wins with the remark: "it is plain that thyropituitarism forms a link between childhood pituitary obesity and hypothyroidism"—a slender link indeed, connecting the unknown with the partly known. But the book is predominantly good, beginning with a clear and brief review of the known facts of endocrine physiology, and giving a first-class account of pubertas præcox. As a "source book" of interesting cases well described it will have permanent value, and it should open the eyes of both general practitioners and pædiatricians to the endocrine factors in disorders of childhood.

The Growth of Science

A. P. ROSSITER. (Pelican Book. Pp. 232. 9*d.*)

DISCUSSED by politicians and derided by publicists, basic English is much in the air these days. The appearance in a Pelican edition of this outline history in basic English is therefore timely. The book, Mr. Rossiter states, is "something like a test of what is possible with Basic English . . . a writer's attempt to give materials for answering the natural question, 'How much would I be able to say with no more than a thousand words?'" He says a lot, and the reader experiences little discomfort. Expressions like "distance through the moon" and "thing-here" may sound a little odd, as does "smoke and metal were a sort of opposites," but of course they may be a matter of choice rather than a concession to basic. However, it is on its content rather than on its phraseology that the book should be considered. This short history is developed in a most attractive, almost conversational way, and covers, in connected fashion, the most diverse forms of natural science. There is a useful chronological list at the end, together with a word list, in which it is stated that yeast is the commonest example of a ferment. If yeast is a ferment, so is a brewer, and man is the commonest example of a kidney.

Clinical Pediatrics

I. NEWTON KUGELMASS, MD, SC D, attending pediatrician, Downtown Hospital, New York. (Oxford Univ. Press. Pp. 393. 12*s.* 6*d.*)

THIS is a recent addition to the Oxford Medical Outline Series in which over twenty volumes by American authors present special subjects in the form of a synopsis. The disadvantages of such a form of presentation are inherent in the planning of the series and it can be said that Dr. Kugelmass has overcome them remarkably well. The book follows the usual lines—growth and development, nutrition and diseases of the newborn being the substance of the opening chapters. Tuberculosis does not appear until the last section, on infectious diseases, so that the chapter on respiratory disorders includes no reference to pulmonary tuberculosis. The lecturer on pædiatrics might find this volume useful in preparing lecture notes, but it is scarcely suitable for the student and too cold and sketchy for the general practitioner.

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THE LANCET

LONDON: SATURDAY, FEBRUARY 12, 1944

CATCHING UP

DOCTORS who join the Services learn much—but not necessarily much medicine or much of the particular kind of medicine they hope to practise later on. In civil life the years following qualification are spent in consolidating the knowledge gained as a student, and in widening it. But in the Services much of this knowledge is "not applicable" and therefore fades, and opportunities for acquiring new knowledge are often limited. There are of course compensating gains of experience, but these are mainly personal rather than professional; so it is not surprising that serving doctors should now be displaying anxiety about their chances of "professional rehabilitation" at the end of the war. In our correspondence columns on Jan. 1 one of them wrote about the contrast between the situation of the Service medical officer and that of young men in the EMS who are (he said) sitting comparatively pretty and taking higher degrees; "these are the people who will have all the advantages in the postwar world." In subsequent letters civilian correspondents have reacted sharply, and very naturally, to the imputation that they are doing unfairly well out of the war; they know they are right in fulfilling—often under difficulties—the essential duties assigned to them. But surely they are mistaken in thinking that Service medical officers stationed in England "have an equal if not better opportunity of reading for higher exams than those of us who are in house-jobs"? No doubt there are still, inevitably, a few posts where it is possible to "fall into the delightful habit of doing nothing all day long"; but, on land at least, the large majority of Service doctors have little time or energy left for extras if they give their mind fully to the job on hand. Nor is it easy to concentrate on private studies while taking part in preparations for decisive battle.

We have all learnt now that war demands unequal sacrifices, and actually (as we were reminded last week) most members of the medical profession in the Forces are in a privileged position compared with combatant soldiers, sailors and airmen. The fact remains that, even apart from risks to life and limb, serving medical officers—especially those with practices and families—have been asked to give up more than their civilian colleagues, who are certainly overworked but usually remain at home and keep much of their personal freedom. If there cannot be equality of sacrifice we must at least ensure, after the war, equality of opportunity, so that as few as possible shall suffer professionally though losing touch for a time with their proper work. This is at once a matter of justice and of expediency. The numbers of doctors available for the community in the next few years will be thousands short of requirements, and the state cannot afford to let any of them fall behind in knowledge and skill through lack of chances to refresh or recharge their memories and realise their potentialities. The country cannot afford inadequate doctors if by taking thought it can add a cubit to their stature; and we must expect a greater demand for good specialists as well as good practitioners. Those now serving, at home or abroad, can be sure that the problem of their return to work on equal terms is now having close attention. Last week, indeed, representatives of the medical schools were at the Ministry of Health discussing what should be done to meet their needs, as soon as they begin to come back. They will, we believe, find themselves regarded not as forgotten men but as a national asset which it is necessary to develop to the full.

They will also find themselves in a changed professional climate. We are entitled to hope that by that time plans will be far advanced for a National Health Service which will offer the returning doctor an assured future, if he likes to join it. The Government have been criticised for beginning in war-time their attempt at medical reconstruction. They would be more to blame if they did not aim at offering the demobilised medical officer something better than the status quo—were they to postpone necessary reforms until he had fought or bought his way into practice on the old terms.

GAS GANGRENE

THE prospect of fighting on the cultivated ground of Western Europe sharpens the points made in MACLENNAN'S latest report on anaerobic infections, which appears on p. 203. If we are to profit from the experiences of the African campaigns, what lessons are in greatest need of emphasis and assimilation? Three stand out—the importance of accurate diagnosis, the urgency of appropriate surgical treatment and the value of intensive serotherapy. None of these is novel, but improved understanding of their relation to each other has raised the recovery-rate in MACLENNAN'S series to 70%—the highest so far recorded for any group of comparable size.

It cannot be said too often that the diagnosis of gas gangrene is essentially clinical. Bacteriological examination is useful for purposes of investigation, but its results do not influence immediate treatment. Anaerobic clostridia may be grown from many wounds in which they produce no effects, and from others in which they give rise to cellulitis without the invasion of muscle (clostridial myositis) which constitutes true gas gangrene. Nor must diagnosis depend on the presence of gas or smell; the really important signs are a sense of weight in the affected area, pain, swelling, œdema and toxæmia. The possibility of gas gangrene should be very much in mind when the wound is in buttock or thigh, when the blood-supply has been endangered, or when the patient has lain out for some time after wounding.

For a few precious hours after bacteria enter a wound their rate of multiplication is ordinarily so low that they do no great harm. The next phase however is one of rapid proliferation, with active formation of toxins; so everything possible should be done to put wounded men in the care of the surgeon before extension of the infective process and increasing toxæmia have reduced their chances of survival. With the massive infection often seen in war wounds the latent interval may on occasion be extremely short, and speed in evacuation is thus a first essential. Measures of resuscitation, chemotherapy and serotherapy may do much to reduce the operative risk, but it is well to remember that in the presence of gas

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gangrene resuscitation may be only partially successful. A valuable suggestion made by MACLENNAN is that if resuscitation and serotherapy fail to restore a wounded man sufficiently for a major operation, much good may still be done by wide and deep incisions of the affected muscles. Such measures, combined with further serotherapy and chemotherapy, may bring about a temporary improvement which permits more radical surgery.

But it is in the use of antitoxin that practice seems to have most need to catch up with what is known. Even when good surgery is combined with the use of so efficient a bacteriostatic agent as penicillin, and the spread of infection has been arrested, the patient may still die of toxæmia[1]; and a study of reports of fatal gas gangrene leads to the conclusion that antitoxin is not always employed either with full knowledge or with enough confidence in its therapeutic value. That it is in fact valuable has lately been demonstrated by MACFARLANE[2] in an analysis of 139 case-records; she found a significantly lower mortality-rate among the patients who received antitoxin, and the difference was greatest in those who were given it early and in sufficient amount.

The principles governing the use of antitoxin in prevention and treatment of gas gangrene have been fully stated[3-5] but it may be useful to repeat some of them now. A wounded man should be given a prophylactic dose of antitoxin if his injury is associated with much destruction of muscle (especially in the region of buttock or thigh), if the blood-supply to the injured area is endangered, if surgical treatment may be delayed, or if there is any other reason to think gas gangrene a likely complication. In case of doubt antitoxin should always be administered. The whole of the contents of one ampoule should be regarded as a *minimum* prophylactic dose, to be given intravenously if possible; if the intravenous route is impracticable the injection may be made into healthy muscle, but never into damaged tissue around the wound. With the newest British preparations an ampoule will contain 22,500 international units of polyvalent antitoxin (9000 units *Cl. welchii* antitoxin, 4500 units *Cl. septicum* antitoxin, and 9000 units *Cl. œdematiens* antitoxin) in a volume of 7 c.cm. or less. Clinical judgment of the local and general condition will decide whether the minimum prophylactic dose is likely to suffice; if delay is inevitable before surgical treatment, the dose should be repeated. Should any signs of gas gangrene be already apparent, a therapeutic dose of antitoxin should at once be given intravenously, the contents of three ampoules constituting one dose. The essential objective is now to prevent death from toxæmia, and to this end persistent repetition of the therapeutic dose of three ampoules is necessary at intervals of 4–6 hours. Antitoxin treatment must not wait till operation is completed—the object is to keep the man alive so that surgery and chemotherapy may have a fair chance to deal with the local condition. There need be no fear in giving really large doses before, during, and after operation. It is the toxæmia that kills; antitoxin in adequate amounts is essential until the man is clearly out of danger. Even when excision has removed the main source of infection, toxin production may continue in small inaccessible remnants of necrotic tissue.

Antitoxin may be administered by syringe or by intravenous drip along with blood, plasma, saline solutions, sulphonamides or penicillin. What matters is that enough should be given often enough. Intensive serotherapy should never be an afterthought, for it is the most hopeful foundation for success.

1. Florey, H. W. and Cairns, H. Report to the War Office. See *Lancet*, 1943, ii, 742.
2. Macfarlane, M. G. *Brit. med. J.* 1943, ii, 636.
3. *Lancet*, 1943, i, 745.
4. Medical Research Council War Memo No. 2. Revised 2nd ed.
5. *Army med. Dept. Bull.* December, 1943.

EPIDEMIOLOGY OF SCARLET FEVER

UNITED STATES epidemiologists have led the way in field studies of infectious diseases, and the study of scarlet fever in Rumania by SCHWENTKER, JANNEY and GORDON,[1] started in 1936, and prematurely stopped by the war, is a model of field organisation. The investigation represents the work of 2 physicians, 4 nurses, 2 clerks and a chauffeur in the field, and 6 physicians with 6 technicians in the laboratory. The field work was conducted in primitive villages around Iasi (100,000 inhabitants), an endemic centre of scarlet fever. The villages chosen had been free from scarlet fever but stood a reasonable chance of becoming infected. In this way the investigators expected to cover the pre-epidemic, epidemic and post-epidemic periods of a single community and to make comparisons with communities in the same locality free from the disease. They had to wait two years for an outbreak to appear in one of the villages.

A Dick test was carried out on every available person. Routine throat swabs on representative samples of the population were designed to watch the changing streptococcal flora. In the village invaded by scarlet fever antistreptolysin titrations of the blood were added. All streptococci were grouped or typed. To save labour and precious sera they were first grouped. Five per cent. were not A, C or G and were not further classified. All group A strains were typed by Griffith's slide-agglutination method, using in the first instance 5 serum pools made up as follows:

Pool	*Types*	*Pool*	*Types*
(a)	1, 2, 3, 5, 27	(d)	17, 18, 19, 22, 23
(b)	6, 8, 9, 10, 25	(e)	4, 24, 26, 28, 29
(c)	11, 12, 13, 14, 15		

Types often interlinked were included in the same pool. After this preliminary screening the organism was tested with the component sera of the reacting pool. Difficulties experienced in typing confirm that it is not easy to classify some streptococci by this method. Climate and season are recognised environmental factors in scarlet fever. Charting the incidence of the disease against latitude the investigators produced a double logarithmic curve: in the tropical belt between 26° N. and 10° S. scarlet fever is absent; in the temperate zones north and south of this belt the logarithm of morbidity varies directly with the latitude. It may be recalled that DE LANGEN,[2] in his account of a sharp outbreak of scarlet fever in a ship travelling from Marseilles to Indo-China, noted that when the ship reached the tropics sore throats continued to appear but no rashes.

Perhaps the most valuable part of the field study is the account of the distribution of hæmolytic strepto-

1. Schwentker, F. F., Janney, J. H. and Gordon, J. E. *Amer. J. Hyg.* 1943, **38**, 27.
2. de Langen, C. D. *Acta med. scand.* 1941, **107**, 53.

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cocci in communities free from, and affected with, scarlet fever. SCHWENTKER, accepting sole responsibility for the conclusions because war had broken up his team, attaches immense importance to the "distribution factor" in the epidemiology of the disease. A correlation between the incidence of carriers and cases is to be expected on a priori grounds, and the investigation showed the logarithm of the disease-incidence to be directly proportional to the distribution of the organism throughout the population, as measured by the carrier-rate. SCHWENTKER, however, regards these not merely as associated phenomena but as cause and effect. The streptococcal carrier-rate determines the epidemiological status of the community. In a population of 1000, if the rate is less than 10, cases will be sporadic, with less than one a year (e.g., 1 in 2 years or 1 in 5 years); if the carrier-rate rises to 10–20 the cases will increase to 1–10 a year and the disease becomes endemic; if the carrier-rate rises above 20, there will be more than 10 cases a year and an epidemic exists. Other epidemiological factors affect the actual figures, but the principle remains. This is the old "carrier-wave" theory applied to scarlet fever. Not only must the number of susceptible persons in a community reach a particular level but so also must the carrier-rate before an epidemic appears. In the outbreak specially studied the carrier-rate began to rise above "normal" several weeks before the first case appeared. (It should be clear that "carrier" refers to anyone harbouring the organism as detected by a single swab; it includes transient carriers and those with a latent infection.) Healthy carriers were found to harbour more than one group or type of streptococci; in only 50% of plates with multiple colonies was a single strain found. This finding is of practical importance in tracing paths of infection among healthy persons; if a single colony only is examined the offending strain will be missed 3 times out of 10. In convalescent carriers the frequency of multiple types is much less.[3] In communities free from scarlet fever all Griffith types of streptococci were found and their frequencies were constantly changing. A type might remain stationary, wax, wane or exhibit a cycle—e.g., rare, predominant and back to rare—extending over months or years. Corresponding to the seasonal prevalence of scarlet fever there was a seasonal rhythm in carrying hæmolytic streptococci, the incidence being highest in winter and lowest in summer. Hæmolytic streptococci other than group A maintained a constant incidence, so that changes in the gross carrier-rate were entirely dependent on changes in the group A rate; during outbreaks of the disease the increase in the group A rate was caused by the type responsible for the epidemic. The practical significance of these findings is that gross carrier-rates, in place of time-consuming group A rates, will provide the required information for crude epidemiological surveys in which the type is not important. In communities where scarlet fever is endemic several types may be responsible, but when an epidemic appears a single strain is usually causal. Although this type may be present in non-epidemic periods scarlet fever does not necessarily appear. SCHWENTKER attributes this to the distribution factor, but the possibility should be borne in mind that epidemic strains of a single type may exist and be indistinguishable by present laboratory methods.

In assessing immunity it was found, as should be expected, that some form of resistance other than Dick-antitoxic immunity participated. The susceptibility of Dick-negative subjects to other streptococcal illnesses, the presence of group- and type-specific antibodies and of hypersensitive phenomena all suggest the existence of an antibacterial immunity. So does the efficacy of convalescent scarlatinal serum, the antitoxic content of which may be as low as 5 or 10 units per c.cm.[4] It is difficult to understand why Dick immunity is not more closely related to bacterial immunity, for a Dick-negative reaction in an adult is generally accepted as evidence of previous acquaintance with an erythrogenic streptococcus. SCHWENTKER, however, says that "no proof has ever been found that changes in Dick reaction in the absence of illness are due to streptococci." In communities free from scarlet fever (but not free from streptococci), the change is attributed to maturity; there can be little doubt that this is a factor, for in scarlet fever, as in diphtheria, immunity rises with age irrespective of infection. What is difficult to accept is that latent infection plays no part; indeed the investigators concede that in communities affected with scarlet fever it probably does. A further interesting observation is that the rate of change from Dick-positive to Dick-negative rises steeply with age—in infants under one year only 5% changed within a year; the figure rose in each succeeding year until it reached 78% in the age-group 15–19 years. Simultaneously there was a change in other members of the community from negative to positive, the rate decreasing with age. (These rates must not be confused with numbers.) The existence of this natural fluctuation in immunity is often not appreciated, although its importance in, say, a diphtheria immunisation campaign has only to be mentioned to be understood. The opinions given on pseudo-reactions conform with generally accepted views on bacterial hypersensitiveness. The investigators found, as was to be expected, that proximity to clinical cases was important in the development of pseudo-reactions, but they also found, somewhat surprisingly, that in areas free from scarlet fever latent infections played no part; indeed pseudo-reactions did not occur. This is in consonance with their finding on Dick immunity in such areas.

The investigation thus confirms many established views with valuable figures from the field, and the few new angles presented are thought-provoking. Well-planned, carefully executed and adequately recorded, this study will be a standard reference.

REGISTRATION OF SPECIALISTS

OUR parliamentary correspondents report a statement by the Minister of Health on the current collection of information about the numbers and types of consultants and specialists in this country. He assured the House of Commons that the lists in preparation "will not be used as a test of eligibility for appointment as consultant or specialist in any comprehensive postwar hospital service." If later it was thought desirable that specialist appointments should be restricted to persons qualified in some particular manner it would be necessary, he said, to establish a register on a statutory basis in a manner approved by Parliament.

3. de Waal, H. L. *J. Hyg. Camb.* 1940, 40, 172.

4. Platou, E. S., Dwan, P. F. and Hoyt, R. E. *J. Amer. med. Ass.* 1941, 116, 1497.

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Annotations

DOCTOR AND WORKER

EVEN after a couple of centuries of industrial revolution the medical profession in this country is not quite awake to the relation between health and work. In the prevalent private or hospital practice the doctor sees his patient as an individual with symptoms, not as one of a group of welders, weavers or whitewash-mixers amid the surroundings of their trade. We know, but we do not always fully realise, that most people spend a third of their time in some industrial occupation which often profoundly affects their health and outlook. Elsewhere in this week's issue Dr. Lloyd Davies shows how medicine must now infiltrate industry in order to prevent unnecessary suffering and disability—in order that, as he says, industry may be fitted to human needs. The sort of work that is crying out to be done, and the sort of person who should do it, were discussed by Dr. Donald Hunter and others at a meeting reported in our last issue. Describing the qualifications needed for a factory medical officer, Dr. Hunter pointed out that there are not enough competent doctors to fill the vast number of posts that already exist in factories "As social-mindedness develops, people are demanding a better industrial medical service."

The nature of that service is considered in a short memorandum just issued by the Association of Scientific Workers. It begins with a survey, necessarily somewhat incomplete, of the existing services, and a re-statement of criticisms now familiar. Medical services, it is pointed out, are provided mainly in the larger factories, but most workers are in small factories and it is necessary for completeness to extend the facilities to them and also to offices and transport undertakings. Under the present system the works doctor is paid by the firm and therefore may be biased in the employer's favour or may have little freedom to express his opinion on factory conditions. Again, the continuity of the medical department of a factory depends on the employer's financial position and some workers have expressed the fear that the departments will be discontinued after the war. The existing medical units in industry are "independent, uncoördinated, unsupervised, and lacking in planned direction." The association think that coöperation with the workers in health matters could be secured by forming health subcommittees to the existing works councils and joint production committees and that such subcommittees might include "trade union shop representatives, medical and welfare personnel, chemists or other scientific workers, safety engineers and management." A voluntary inspectorate of workers in each shop could be linked with the committee. They hold that in industrial health research this country lags behind others with large industrial populations and they believe it to be essential that research should be placed on a sound basis before expansion of the industrial medical services goes much further. The works doctor should be enabled to carry out research if he wants to do so; he should act as a source of problems for research, and he should be allowed freely to apply the results in the factories. The works medical departments should be linked with research organisations and there should be a central bureau of information.

The memorandum goes on to say that there are two practicable ways of organising an industrial medical service. The first would be to make the service an integral part of a national health service; if this were administered through regional health boards covering areas wider than the present local-authority areas, the industrial medical officer would be controlled by the regional board and would thus come under the same authority as the home treatment, public health and hospital services. On this scheme the factory inspectorate would remain under national control, but it is thought that "this department should be integrated with the health services on the national level"—which presumably means that it should be transferred to the Ministry of Health. The alternative scheme arises from the principle that works doctors should be concerned with the working environment. The Factory Department is the authority for enforcing, through its inspectors, the legal minimum standards. And if the industrial medical service were placed under the control of this department the works doctor would be closely linked in its preventive work. One objection raised to this arrangement is that the Factory Department, as now constituted, has no control over doctors in mines, transport and offices. If a really comprehensive national health service is developed, the association would prefer the first scheme; but if the changes are to be restricted to an extension of National Health Insurance, they feel that the Factory Department will be in the best position to build up a satisfactory industrial medical service.

PATENT RIGHTS AND THE BRITISH PHARMACOPŒIA

AT the last meeting of the General Medical Council, Prof. David Campbell said the pharmacopœia committee had decided that in selecting drugs for inclusion in the British Pharmacopœia, the *BP* Commission need not consider its choice restricted by actual or potential patent rights in manufacture.[1] This is a logical extension of the policy adopted in 1934, when it was decided to include substances whose patents expired shortly after the publication of a new edition of the *BP* or any addendum. It is also in accord with the present trend of therapeutics. As Sir Henry Dale emphasised in his Hanbury lecture, the aim of medicinal treatment is moving rapidly away from the relief of symptoms and towards the removal or prevention of the causes of disease, and with that change natural drugs are giving place more and more to synthetic organic substances, prepared by large scale manufacturers and commonly protected by patents. The *BP*, then, is but moving with the times in including patented substances. Moreover, the inclusion of a drug in the *BP* confers on it a certain status, and the non-inclusion of a substance on the purely technical ground of a patent might be regarded by a doctor unacquainted with pharmacopœial practice as an indication that it was less reliable than another which, not being patented, was included. It is in the interest of the public, too, that the standardisation of important drugs, whether patented or not, should be in the hands of the *BP* Commission, which has all the experience and skill needed to carry out the work. In including patented drugs the *BP* is in line with the *USP*, which has already adopted the same policy. Inclusion will not, of course, give anyone but the patentee and his licensees a right to make the drug.

A LITTLE OF WHAT YOU FANCY

IT is characteristic of the British attitude towards food that a frank recognition that we like such and such a comestible or beverage is taboo. If you want to sell us some food or drink it is not enough to tell us that it will please our taste, you must also convince us that it will make us grow, or our hair curl, or will present us with this or that vitamin. Perhaps this is British hypocrisy, for it recalls Mr. Pecksniff's motive for indulging in the pleasures of the table, or it may be the obverse of English puritanism which believes that if a thing is unpleasant it is ipso facto good for you. So it is cheering news that there is riboflavin and nicotinic acid in beer, tea, coffee, cocoa, vinegar, and meat and malt extracts. Such substances are normally thought to be of little food value by experts on nutrition. Ever since it was

1. *Lancet*, 1943, ii, 711.

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learnt that yeast is a potent source of what we now know as aneurine, thiamine or vitamin B_1, unsuccessful attempts have been made to show that beer contains that vitamin. Now however that the importance of two other members of the B complex—riboflavin and nicotinic acid—have been recognised, the distribution of these in different beers has been estimated at the School of Malting and Brewing in Birmingham and at the Cereal Research Station of the Ministry of Food.[1] The results are all to the satisfaction of beer-drinkers. A pint, even today, may add 283–962 microgrammes of riboflavin to our diet, which is a long way towards what we should obtain in a day; the strong brewed ale of peace-time might have added more than double that amount. Similarly, beer contains some 400 μg. of nicotinic acid to the pint—not much, but an amount not to be sneezed at. Moreover, according to Drummond and Moran, it is a reasonable assumption that it contains appreciable amounts of biotin, pantothenic acid and inositol. Moreover, half the phytates of the barley have been split in the process of malting, so they cannot exert their pernicious influence on the absorption of calcium. Not to be outdone, the teetotaller gets riboflavin in his tea. A breakfast cup may contain 10 μg., so Mrs. Weller and her visitors, even before they swelled wisibly, may have staved off ariboflavinosis. When Dr. Sydenstricker visited England he was puzzled by our relative freedom from riboflavin deficiency compared with the USA; beer and tea may provide the answer, though our 2 oz. of tea per week will yield but .73 μg. a day, hardly a protective dose. A tea-drinker would have to consume nearly 1 lb. a day to rival a modest beer-drinker in the quest for riboflavin. Finally, both meat and malt extracts appear as significant sources of riboflavin and nicotinic acid, so it will tax anyone's ingenuity to dodge them altogether.

PHARMACOLOGY OF NAUSEA

THE prevention of seasickness is still empirical and more a matter of faith than reason, but a rational approach is offered by the recent work of Stewart Wolf,[2] which throws some light on the physiology and pharmacology of nausea. By experiments on healthy men as well as on Tom, his now familiar subject with a gastric fistula, he studied the effect of nauseating stimuli such as caloric vestibular stimulation and swinging, and even the emotional stimulus of fear, on gastric activity. The evidence obtained shows clearly that the first reaction to any of these stimuli was a reduction of gastric motility and a decrease in the tone of the stomach muscle. The sensation of nausea, the pallor of the gastric mucosa, the decreased secretion of hydrochloric acid and the increased production of mucus were secondary in point of time, as were the other usual concomitants such as salivation, sweating and changes in pulse-rate. By reducing the intensity of the exciting stimulus it was possible to limit the effect to a decrease in muscular movement. This led Wolf to see whether he could prevent the nauseating effect of vestibular stimulation by the action of physostigmine in increasing gastric contractions. Successful in this, he suggests that by a pharmacological control of gastric motility it should be possible to prevent nausea. These findings provide an experimental basis for the work of Holling and his colleagues,[3] who showed that the belladonna alkaloids have a significant effect in preventing seasickness. It might be argued that atropine and its allies are anti-parasympathetic and therefore should produce effects the reverse of what are desired. Anderson and Morris[4] however have demonstrated that subcutaneous administration of atropine in doses less than 1 mg. increases gastric motility, so that 1 mg. of atropine given by mouth probably stimulates the movements of the stomach. Holling's results indicate that hyoscine in doses of 1·2 mg. is of all the remedies tested the most efficient. It would be interesting to determine at what dose hyoscine ceases to stimulate and begins to inhibit gastric contractility. But mere inhibition of stomach movements is not the whole explanation of nausea, for large doses of atropine completely inhibit them without producing any feeling of sickness. This suggests that the increase of gastric contractility does not itself prevent nausea but is merely an index of some central action of the drug. Of more immediate concern for the practical man is the prospect of relief for travellers by sea and air.

1. Drummond, J. C. and Moran, T. *Nature, Lond.* 1944, **153**, 99.
2. Wolf, S. *J. clin. Invest.* 1943, **22**, 877.
3. Holling, H. E., McArdle, B. and Trotter, W. R. *Lancet*, Jan. 22, 1944, p. 127.
4. Anderson, W. F. and Morris, N. *J. Pharmacol.* 1943, **77**, 258. See *Lancet*, 1943, i, 783.

MUMPS IN SCHOOLBOYS

MUMPS is largely a disease of school age and its worst features are reserved for the male sex. In a careful analysis of cases at Rugby School, Smith[1] demonstrates the unpredictable nature of the disease by quoting outbreaks varying from one or a few cases to a recent epidemic with an attack rate of 42% of the resident population. Among clinical curiosities culled from the latter epidemic was one case with involvement of the parotid accessory lobe, the main gland resisting the infection. Sublingual mumps was seen only twice among 136 cases and in one there was an associated œdema of the anterior chest wall which subsided rapidly. Smith favours Philibert's[2] view that the mumps virus enters the body through the conjunctiva and is incubated in the central nervous system before being excreted in the salivary glands, but if this is so the almost complete absence of prodromata in his cases is difficult to explain. Among complications he draws particular attention to 6 cases where there was a sharp bout of pyrexia without localisation. The genital organs were involved in 13 cases and he notes that the epididymis is often involved before the testicle. Orchitis was usually mild and not characterised by the same amount of pain as is the lot of adults with this complication. He supports those who believe that complications, including orchitis, occur almost as frequently whether the patient is strictly confined to bed or not, but in allowing his patients up within a day or two of the disappearance of salivary gland swelling he is no more than following current fever hospital practice. Most people will agree with him too that for all practical purposes infectivity may be regarded as over at this stage.

ACUTE MEDIASTINITIS

To collect a hundred personal cases of a rare condition and present a complete account of them is a considerable achievement. Some years ago Neuhof[3] (who holds the chair of clinical surgery at Columbia University, NY) published 60 cases of acute mediastinal infection; since then he has collected 40 more, and, with E. E. Jemerin, has published an analysis of them in book form.[4] Case-histories have been classified under four headings according to causation:

1. Œsophageal trauma accounted for 40 cases and instrumentation was responsible for nearly half of these.
2. Upper respiratory infection, secondary to such conditions as pharyngitis and retropharyngeal abscess, accounted for 28 cases.
3. Lung and pleura infections spread to the mediastinum in 19 cases.
4. Miscellaneous factors were responsible in the remaining 13.

Mediastinitis is apt to be overlooked in the presence of a dominant causative lesion. The symptoms—fever,

1. Smith, R. E. *Guy's Hosp. Rep.* 1943, **92**, 1.
2. Philibert, A. *Progr. méd., Paris*, 1932, **4**, 145.
3. Neuhof, H. *J. Thoracic Surg.* 1936, **6**, 184.
4. Acute Infections of the Mediastinum, London, 1943, pp. 407, 33*s*.

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cough, dyspnœa and cyanosis—resemble pneumonia. Dysphagia is common and pain always present if the œsophageal walls are perforated. Neuhof and Jemerin point out that the classical signs of mediastinal compression are rarely seen because the process is too acute. X rays show widening of the upper mediastinal shadow, and an increase in the retrotracheal space, viewed from the side. The presence of gas is a valuable early diagnostic sign. Not all cases proceed to suppuration: of the 28 secondary to upper respiratory infection, only 17 formed pus. Whether a localised abscess forms or suppuration remains phlegmonous, surgery they believe offers the only real hope of cure. Drainage must be established early, for even a localised abscess may burst into the fascial planes around it.

In many cases of mediastinitis extending as far down as the aortic arch they have found drainage through the neck to be feasible. The incision is made along the anterior border of the sternomastoid, the carotid sheath is retracted outwards, and the pretracheal muscles and the lower pole of the thyroid gland are drawn inwards. Dissection is carried down to the prevertebral region, where the infected tissues are recognised and opened. With infections low down in the chest a thoracic approach is needed. Damage to the pleural cavity must be avoided; this may be technically difficult because the pleura becomes adherent over the site of the inflammation and cannot be reflected, so that a two-stage operation may be advisable. Even with accurate diagnosis and early treatment the fatality-rate from acute mediastinitis is high. Many cases are fulminating, and others are not recognised early enough.

LOCAL CHEMOTHERAPY IN EYE INFECTIONS

SULPHATHIAZOLE has so far proved the most effective of the sulphonamides for local use in eye infections. Sulphanilamide is more soluble but also more toxic, and is relatively inactive against the pneumococcus and staphylococcus. For application to the eye 5% sodium sulphathiazole is used, preferably in the form of an ointment. Sensitivity to this ointment is reported in 0·5% of patients at the Presbyterian Hospital in New York.[1] Experiments show that the action of sulphathiazole is enhanced by rise of temperature, and thus foreign protein or other fever therapy may be usefully combined with chemotherapy in severe ocular infection. The absorption of sulphonamides from the conjunctival sac can be increased by combining them with a "wetting" agent which lowers surface tension; more of the sulphonamide will enter the eye and less will run down into the nose. In the treatment of infections a high concentration of sulphonamide is needed in the anterior chamber, and when a mixture of sulphathiazole and a wetting agent is applied to the eye the concentration of sulphathiazole in the anterior chamber will be consistently higher than when the sulphonamide is applied alone. Bellows and Gutman[2] report that when 'Aerosol O.S.,' 0·5%, was added to sulphathiazole paste absorption was increased by 50%, and by raising the room temperature this figure could be made 75%; they do not mention any clinical trials. Studies[3] have been made of the regeneration of the corneal epithelium in rabbits in the presence of sulphonamide drugs after it has been completely removed under cocaine anæsthesia. The drugs were used in suspension, powder or ointment form and were applied to one eye while the other served as a control. Regeneration of the epithelium was observed closely by staining with fluorescein. In the control group the epithelium was completely restored in an average of 5·1 days, while the treated group averaged 13·3 days. In some instances the epithelium did not regenerate until the sulphonamide had been stopped, but one would like to know how far this healing process was delayed by the manipulations to an eye into which an ointment is inserted three times a day. In addition it was noticed that there was greater corneal scarring where the sulphonamide drug was used, and it seems evident that these drugs should not be used locally in the eye unless the chemotherapeutic advantages in obviously infected cases outweigh the risks of increased scarring and delayed healing. A combination of 5% sulphathiazole with 0·1% proflavine might overcome this difficulty.

1. Thygeson, P. *Arch. Ophthal. N.Y.* 1943, **29**, 1000.
2. Bellows, J. and Gutman, M. *Ibid*, 1943, **30**, 352.
3. Bellows, J. *Ibid*, p. 65.

USES OF BRONCHOSCOPY

NOWADAYS the need to remove an inhaled foreign body is not the only, or even the chief, indication for bronchoscopy. It is used more often in the treatment of postoperative bronchial obstruction from collapse or accumulated secretions in the lung, and is a useful preliminary to the diagnosis of many chest conditions. The increase in postoperative chest complications is probably associated with the increase in abdominal surgery and the length of time spent on operations by modern surgeons. Anæsthetics, which have relieved the surgeon from the terrible need to work swiftly, have perhaps lulled him into an unduly leisurely technique. Bronchial obstruction after operations is often attributed to mucous plugs, leading to collapse. At a joint meeting of the sections of laryngology and anæsthetics of the Royal Society of Medicine on Feb. 4, bronchoscopists agreed that though suction through the instrument effectively remedies the condition, no plug of mucus has ever been demonstrated. The cilia lining the respiratory passages play an important part in keeping the airway clear, and several speakers condemned the common and excessive administration of atropine. Dr. M. D. Nosworthy pointed out that much can be done by postural treatment and encouragement of cough to remedy postoperative lung conditions without bronchoscopy; and he foresaw the day when patients would be instructed and exercised by the anæsthetist in such measures both before and after operation.

War has enlarged the field in which the bronchoscope can be applied. In blast injuries where there is no external bruising but the lungs are loaded with extravasated blood the diagnosis can sometimes be made only by bronchoscopy; aspiration of the blood through the instrument has already saved life in several instances, and may offer the only hope of recovery. Lieut.-Colonel Norton Canfield, USA, suggested that as the war goes on the method may prove useful in the treatment of thermal and chemical burns of the trachea and bronchi.

Several speakers maintained that a local anæsthetic applied to the throat of a patient sitting up in bed is the most suitable preliminary to bronchoscopy. 'Pentothal' anæsthesia was held to be dangerous for a patient with excessive pulmonary secretion. Though there were some dissenters, it was fairly generally agreed that bronchoscopy was usually preferable to blind methods of aspiration. When an abscess is to be drained it was said that anæsthesia should only be deep enough to control the larynx.

THE British Council has appointed Mr. W. C. W. NIXON, FRCOG, surgeon to outpatients at the Hospital for Women, Soho Square, London, and lately professor of obstetrics at Hong-Kong, to be its medical representative in Turkey.

"... Is it dreaming too much to wonder whether we might have doctors believing so much in the practice of nutrition that their belief will be expressed in the hospital diet? .... Some of us are giving a great deal of attention to getting all the children of the elementary schools properly fed. We may possibly have arrived at the stage when this can be extended to the public schools and the universities.—Lord WOOLTON, Minister of Reconstruction, reported in *News-Chronicle*, Feb. 1.

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Reconstruction

FITTING INDUSTRY TO HUMAN NEEDS

THE CONTRIBUTION OF MEDICINE TO INDUSTRIAL WELL-BEING

T. A. LLOYD DAVIES, MD LOND, MRCP
MEDICAL OFFICER, BOOTS PURE DRUG CO. LTD., NOTTINGHAM

WHATEVER may be the ultimate pattern of industry, whatever may result from the struggle between state control and private enterprise, one thing is certain—men and women will have to work in industry. But industry must be adapted to human needs, for men are more important than machines. A man spends eight hours a day at work, eight hours asleep, and the remaining eight hours are made up of a varying amount of exercise, pleasure, rest and domestic pursuits. Many of the industrial problems connected with the war arise because of the encroachment on exercise, pleasure and rest by the need for more and more work.

The effect of work cannot be divorced from the factors operating out of working hours, in the home, at play, or during sleep. In his home a man is subject to the influence of his wife, children, neighbours, and indirectly of his local authority, through water-supply, drainage, electric light, housing schemes. Most of all a man is influenced by the sufficiency, or lack, of food. To build a "whole" man, a proper balance of work, sleep and leisure must be maintained—indeed it is the function of medicine to study these needs, and of industrial medicine to study environmental factors affecting the health and well-being of persons at their place of work. As medicine knows no limit of race, creed, or class, the criterion of industrial medicine is, or should be, one of need. The environment of the factory worker, shop assistant, transport worker, office clerk, hospital nurse, domestic servant, and even the university student may all need study and control.

Theoretically, if a man, a group of workpeople, a community, or a nation is in physical and mental health, working under good conditions, with satisfying work, with proper provision for sleep and leisure, there should be no illness or ill health arising from the effect of industrial conditions. It is precisely because we have not attained this ideal that the need for the study of industrial conditions arises. The life of man should not be shortened or made a burden by conditions to which he is subject whilst at work, yet even today many occupations are of a deadly character. Assuming the average mortality of males aged 20–65 years to be 100%, tin and copper miners who work underground have a mortality of 342%, sandblasters 304%, other metalliferous workers 283%, kiln and oven men in the pottery trade 157%, stevedores 220% (who, incidentally, have the highest fatal accident rate—429% of the average), slate miners 168%, glass blowers 160%, and inn-keepers 155% of the average. The risk in all these trades (except inn-keepers) arises because of the inhalation of dust; indeed, a man's trade can often be diagnosed from the appearance of an X-ray film of the lungs (Registrar-General 1931).

Figures like these show that there is still much *avoidable* human suffering. Yet there is no industrial risk which cannot be prevented. Often the necessary measures may be difficult, may require research, or prove costly, but are we to be deterred by such obstacles? Should not the nation rather ask, can we afford to allow such conditions to continue? Measured against the suffering of body, mind and soul, of a man and his family, the price is enormous. Few not in intimate contact with the working man can realise what it means to feel his powers of work slipping from him, his ability to earn and support his family failing, and to see his children slowly descending into poverty and squalor.

A workman can do little to help himself in industry—he has to accept conditions as he finds them in a factory. While there is no doubt that the vast majority of employers do not want a workman to suffer, many industrial hazards arise from indifference, ignorance or prejudice. In considering any industrial hazard, the question to be answered is not how little need be done to protect the worker, but how much. Yet protective measures often are shirked for financial and other reasons. A workman's capital is his health and ability to work; without these assets he is bankrupt and useless. Until an employer has taken every possible step to protect the health, safety and welfare of the workers, little or no blame can be attached to the workman for any accident or mishap. Health, safety and welfare form a triad on which the whole structure of industrial medicine rests and on which the whole of our factory legislation—and indeed much of our social legislation—has been built.

ACCIDENTS

Taking accidents in the broadest sense of the term, as defined in the Workmen's Compensation Act, to include any accident or disease arising "out of and in the course of employment" resulting in an absence from work of more than three days, an enormous toll of suffering continues to be exacted each year. For example, in seven major groups of industries (mines, quarries, railways, factories, docks, constructional works and shipping), employing 7,860,501 persons in 1938, 459,223 compensatable accidents occurred for which £6,765,067 was paid as compensation (Workmen's Compensation 1938).

In spite of the large sums of money paid annually, no Workmen's Compensation Act can give adequate recompense; and in any case the total economic loss is many times greater than shown. Indeed, the Chief Inspector of Factories in his annual report for 1941 has pointed out that it is an under-statement to say that accidents occurring in factories in 1941 caused from 20,000 to 30,000 workers to be constantly off work, with a loss of over 50 million man-hours a month.

War has led to a great increase in the number of accidents, and for factories a comparison between 1938 and 1941 shows, for example, an increase of 42% amongst men and 192% amongst women. In 1942 accidents had increased by 51% for men and 389% for women over 1938. The great increase in the accidents among women has occurred partly because of the greater number of women in industry, and partly because they have taken their share of dangerous work. Ignoring any humanitarian feeling, on economic grounds alone every possible step must be taken to prevent this loss to production.

PREVENTION

How can accidents and industrial diseases be prevented? This problem has exercised the minds of many able men and women for many years. Prevention is the keynote of all industrial medical practice.

Medical examination before employment of all applicants for work is essential. Properly conducted, this examination is not only designed to protect the employer, but also the employee. The problem to be decided is whether the applicant is fit for the job, whether he will come to any harm if so employed, or whether he will cause harm to others. The automatic rejection of an applicant because of some abnormality is unjustifiable; a man with heart disease, though not fitted to drive a heavy lorry, may be fit for clerical work or storeman's job.

After employment, periodic medical examination may be required, especially if the work involves special hazards, such as contact with lead, mercury, asbestos, silica. One of the biggest burdens of industry, which makes periodic examination essential, is the added risk of tubercle, especially where silica may be inhaled; indeed this risk may be the actual factor which shortens life. In war, medical examination is especially important as it is one of the means—perhaps the most important—of ensuring that each employee is working to the greatest capacity. This indirectly means that the employee is not only doing most for the war, but is happy and satisfied with his work.

After engagement, when new employees enter the factory, they should not be left to find their own way about, but should be shown the cloakroom, canteen, and lavatories, and introduced to the foreman. Treat all employees as individuals and they will respond in a magnificent way. The work should be fully and carefully explained and any risks pointed out. If protective clothing is necessary, the need for it should be explained, how to clean it and how to replace it when worn out; but it must be remembered that protective clothing may

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fail as it departs from Sir Thomas Legge's (1934) famous dictum :

"If you can bring an influence to bear external to the workman (i.e. one over which he can exercise no control) you will be successful; if you cannot or do not, you will never be wholly successful."

Many an eye is blind because goggles were removed for some reason at a crucial moment.

In dealing with a toxic process, the first question to ask is whether the toxic material or process can be eliminated. A perfect example of this is the disappearance of "phossy jaw" after the substitution of white phosphorus by phosphorus sesquisulphide in the manufacture of "lucifer" matches. More recent examples are the use of carborundum type abrasives instead of sandstone wheels in grinding, and the substitution of aluminia in pottery works in place of flint for embedding china, both of which promise to reduce the incidence of silicosis in these industries. If the toxic material or process cannot be eliminated, it must be enclosed, or all toxic fumes, vapours, or dusts, removed by exhaust ventilation—for example, asbestos, benzene, lead, radioactive substances. But at all times, and in the most unlikely places, watch has to be kept for dangerous processes. Many people would not realise that a shipbreaker may, unless proper precautions are taken, be exposed to the risk of lead poisoning, or a hatter's furrier to mercury poisoning.

Education, lectures, safety devices, are all important in the prevention of accidents and industrial diseases, but most of all is example on the part of the management, directors, works' managers, foremen and workers, so that they are all working as a team to prevent industrial hazards. The industrial medical officer forms part of this team, and without this teamwork he will achieve little. But when all is said and done, accidents remain a managerial responsibility; the management must provide the conditions for the prevention of accidents and ill health.

Besides specific industrial diseases and accidents resulting from obvious causes, such as unguarded machines, or toxic processes, there are many other less obvious—but equally important—causes, which affect all the persons in the factory. These are associated with lighting, heating, ventilation, sanitary arrangements, and canteens. The nearer conditions approach comfort, the fewer accidents, and the greater the output. For example, it is easy, by questioning, to determine the temperature at which most people are comfortable though the exact temperature will vary according to individuals, the season, and the type of work. For light work most people are comfortable at 67° F. with an air velocity of 100 ft. per min. Osborn and Vernon (1922) have demonstrated in one group of workers that at 47–55° F. accidents were 34% more than at 67° F. when they reached the minimum; but when the temperature went up to 77° F. accidents were 23% greater. Similar figures can be produced for lighting, ventilation, and humidity; where the greatest confort has been achieved, not only have accidents been reduced to a minimum but output is highest. Lessons of this sort were learned in the last war and should never be forgotten.

Of great importance in war-time is feeding. Today the canteen has become an essential part of a factory; obviously well-fed workers are in better health and produce more than the ill-nourished ones. Canteen workers are as important as other factory workers and deserve, though they seldom get, equal pay and status.

THE WORKERS THEMSELVES

The average Englishman today is not a noble knight mounted on a white charger, given to rescuing fair damsels amid pastoral surroundings, but a weedy, pale-faced individual brought up amid dirt, poverty, squalor, and lack of food. But he is tough—indeed he needs to be. In *Our Towns* (1943), which is an indictment of social conditions, a pertinent story is recounted.

As a bus went along the main street of a prosperous seaside town, a housewife in the bus, looking at a group of poor, unfed and under-clothed children standing by the side of the road, said to another woman "They don't look much do they?" "Well, anyhow" replied her companion "That's what England always falls back on!"

There is little choice about the future of the average boy and girl leaving an elementary, or even secondary, school in this country. Brought up in dirt, with one water tap in the basement of a tenement house, with one so-called lavatory (which is often an earth privy across some waste ground) to serve several families, with bad overcrowding in many of our northern towns, and with food insufficient, both in quality and quantity (before the war 22½ million people were receiving a diet deficient in some respect), is it remarkable that at the age of 14 years, the elementary school child is glad—glad, mark you—to get a job of any sort at the nearest factory? Not only does he gain some freedom from the squalor of back streets, but the family exchequer is greatly relieved by the change. Small wonder that the physical condition of juveniles entering industry is poor.

The results of the medical examination of juveniles entering a large firm in the Midlands confirm this picture (see table).

PHYSICAL AND NUTRITION STATUS OF JUVENILES, AGED 14–16 YEARS, APPLYING FOR EMPLOYMENT IN A FACTORY (MAY 1940 TO MAY 1943)

Physical status.	BOYS					GIRLS				
	Nutrition.				Total	Nutrition				Total
	1	2	3	4		1	2	3	4	
(A) Fit for employment; no defects	21	23	5	0	49	52	77	12	0	141
(B) Fit for employment; minor defects (e.g. dental caries,* flat feet, knock-knee, defective vision correctable by glasses)	94	185	93	5	377	299	514	250	38	1101
(C) Fit for restricted employment; major defects not easily corrected (e.g. hernia, heart disease, severe knock-knee, diabetes, quiescent tubercle)	5	17	15	3	40	8	29	46	6	89
(D) Unfit for employment (e.g. owing to insanity, active tuberculosis, epilepsy)	..	..	..	..	12	..	..	..	..	22
Total	120	225	113	8	478	359	620	308	44	1353

Nutrition: 1 = Excellent, 2 = Good average, 3 = Fair, 4 = Bad.
* Dental defects made up just under half the total.

The defects in many cases were trivial (for example, bad teeth, slightly subnormal vision, hammer toes), but nevertheless they were defects that might affect the child's capacity for work or enjoyment.

All these children have, since the age of 5, been subject to the efforts of the school medical service but this service is compelled to correct defects already present when the child first comes under supervision. Fortunate indeed is the industrial medical officer who has the care of a group of children, for efforts here are well repaid in later years.

Under mass production, factory work is repetitive and uninteresting. Youth is adventurous and dislikes the dull conditions of a modern factory life; and who has not had youthful dreams of a land filled with promise? Too, too often do children when re-examined after being at work for six months, say in reply to questions how they like their work "It's all right" or "It's not bad." But in a few more months they are happy. Often the proud industrial medical officer or welfare worker will say that they have settled down, but how often is it that their spirits have been broken on the grinding wheels of industry? The Education Act 1917, better known as the Fisher Act, was intended to be a charter for children, but unfortunately the "appointed day" for setting up day continuation schools, except in Rugby and in a few enlightened firms, was never appointed. The gradual release from school supervision and the continuation of general education by the few day continuation schools now existing, has proved that the development intended by the Fisher Act is long overdue. Even with the raising of the school-leaving age to 15 and later 16 years, and the continuation of education one day a week to 18 years of age, now proposed by the Board of Education, the change from school to industry will remain for some children a time of difficult adjustment.

It is significant that the Factories Act passed in 1833, besides appointing four factory inspectors, limited the

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hours of work for children below 13 years of age to 9 hours a day, and for young persons aged 13 to 18 years to 12 hours a day, and made it compulsory for children who were employed in industry to attend school for 2 hours a day except Sundays. This act, which was the real beginning of factory legislation, was largely evaded by employers and by the children and parents themselves. Subsequent factory acts, while limiting the hours of employment of young persons and women, did not continue the association of education and industry. Hours of work of young persons and women are now restricted to 48 a week, but if after the war it is not too much to hope that they will be further reduced, and men brought within the protection of the Factories Act, provision must be made for the proper use of leisure by children and adults. The continuation of education seems on this argument alone to be essential.

Hours of work are of the greatest importance to the factory worker, not only in themselves but because of the effect on wages. No measure has a greater effect on the health and happiness of workers than wages, and indeed, proper wages make many so-called welfare measures unnecessary. Increase the true value of wages and you increase the standard of living. One way of doing this is for longer hours to be worked; in war, when costs are of less importance and every effort must be made to increase output, there is a tendency to lengthen hours. Long hours do not increase output and are in no-one's interest. If the worker's income is insufficient the basic wage should be increased.

There are many—doctors, lawyers, parsons, business magnates, and others—who do not work to set hours. They are free agents, with an interesting and infinitely variable job, and it does not matter if they are a few minutes late in starting work, for they work as individuals. But how could anyone be interested in feeding 10,000 pieces of metal a day into a stamping machine?

Much has been said, but very little done, about absenteeism. In all groups there are a few shirkers but the average working man is a very decent fellow and if he develops a few aches and pains, or feels fed-up, should this cause surprise? Added to this, for women, and especially married women, who are now taking a great share of the industrial burden, there are domestic responsibilities, homes, children, husbands; the wonder is that married women are able to do two difficult jobs so well. A little kindly understanding by foremen and managers is all that is wanted, and arrangements should be made for those with responsibilities (such as married women) to have time off to fulfil these. Time will be, and must be, taken off; so surely it is better to organise this so that production will not suffer.

PRIDE OF WORK

Workpeople are individuals and entitled to treatment as such. The old miner, as depicted in *How Green Was My Valley*, was an individual, and was proud of his work. But soon after the industrial revolution in the earlier years of the last century the spectre of mass production began to raise its head. Labour was employed in masses, the slums now making our manufacturing towns were built to house the workers in masses, and worst of all the old relationship of trust between master and servant was lost. That is the root trouble of the frequent labour dispute of the present century—we are paying the price for the sins of our grandparents who lived in the glorious Victorian era.

There is nothing to be ashamed of in being a workman, and a true craftsman is proud of his calling and of the result of his labour. Are we to return to the industrial conditions prevalent in the so-called 20 years' peace after the last war? Are the men and women of this country to feed machines to turn out mass-produced goods—much of it trash—in ever-increasing quantities to keep the machines going so that there is an ever-increasing quantity of rubbish to be bought by the workers who kept the machines going? Are we to educate our children to be petty clerks and black-coated drudges so that they should not soil their hands by labour or craftsmanship, or by contact with the earth, which is our very being? Or are we to return to true craftsmanship and true progress where labour is valued in its own right, where production is planned to produce things of real value, where industrial casualties do not occur, where slums, poverty, dirt, lack of food are of the past, where town and country know each other, and where there is, above all, trust and friendship between master and servant, and between all men and women working in industry? That is the question for the future; that is what this generation has to decide; and when it has been answered, not only has the future of industry been decided, but also the future of this country. For a country is as great as its citizens—ordinary men and women.

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Special Articles

THE HEALTH OF FRANCE

(FROM A CORRESPONDENT)

UNLIKE Belgium, France before the war grew enough food for her own needs. But during the years of occupation the demands of the Germans have eaten into her resources, and the French medical profession expresses grave concern at the malnutrition of the people.

Professor Balthazard's presidential address to the Académie de Médecine at the beginning of last year dealt with the deplorable effects of long-continued deficiency in diet. In order that the nation should merely maintain its physical and moral equilibrium, he said, it was essential that the quantity of food available for them should be increased by 20%. "The physiologists of Germany have studied, with a precision to which we pay homage, the number of calories with which a ration must supply the individual. The conclusions of Pettenkofer, Voigt, and Rubner cannot be disputed in France any more than in Germany." For health the basic ration should contain 3000 calories for an adult, with a well-balanced proportion of carbohydrate, fat and protein. By reducing activity it was possible to live on a smaller ration, but 1800 calories was the minimum if serious troubles were to be avoided. In 1917–18 the Germans were reduced to a ration of 1600 calories which they considered inadequate, leading to loss of weight and strength, hypotension, bradycardia and mental derangement. "This," said Professor Balthazard, "was proclaimed by the Germans as a state of semi-famine. What shall we call our condition, with our 1100 calories, to which those who can use the Black Market can add 1, 2 or 300 calories at the most? For the majority of the population the food ration is below 1500 calories—300 short of the basic minimum. These 300 calories would be provided by the 20% extra food which is lacking from our supplies."

The underground newspaper *Avenir Médical* (March–April, 1943) describes some of the effects of food shortage in France. Adolescents are losing weight. Want of strength reduces the competence of adults for their work and favours accidents. Hypotension and anæmia are common: in the Bordeaux region 46% of blood donors had to be rejected. Bone decalcification and rickets are seen as in the regions invaded in 1914–18. "War amenorrhœa" is prevalent in girls and young women, and is the more disquieting because, it is said, experience after the last war showed that it impairs fertility later. Famine œdema, first noticed in institutions (such as prisons and asylums) with a uniformly inadequate diet, is now seen more and more often in private and hospital practice. Tuberculosis has risen by at least 20–30%, and takes malignant forms rapidly fatal especially in young people. The young are today exposed without resistance to virulent infections. "Though loss of weight is the most obvious sign of malnutrition, all the bodily functions are in fact affected: the state of the blood, bones and respiratory tract is altered and makes our patients more liable to disease. Pregnant women, inadequately nourished, bear underweight infants, with a growing proportion of stillbirths. After delivery, the extra food allowed on the rations does not even replace in calories the milk given by the mother to the child." The cow's milk generally supplied

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is heavily contaminated and a cause of gastro-enteritis in infants. Adults generally manage to protect their health better than the young, but old people, whose rations are wholly insufficient, especially when they live alone, are destined to a rapid death. As for the victims of political repression, in the concentration camps and prisons of the regime they receive no sanitation, no food, no care: they are only transferred from their gaols to hospital for registration of their deaths.

It is not only in France but among the workers sent abroad that malnutrition and tuberculosis are rampant. "French doctors see with horror the ever-increasing number of French workmen sent to Germany who return to their country to die of rapid phthisis."

The profession are helpless to save the lives of the people, for they are unable to prescribe the proper diets or to provide the necessary drugs. The most elementary necessaries are lacking: on the lists of the "unobtainable" are caffeine, bismuth, quinine, iodine, iodides, morphine, soft paraffin, fish-liver oils, and insulin; there is no gauze, no cotton-wool, no dressings; the shortage of soap increases the general difficulties, leading to widespread infections and skin diseases.

It is no wonder that doctors are resisting in every possible way. One of the most useful and immediate methods is to sabotage the deportation of workers. The resistance radio station "Poste Nationale Française" said on Oct. 4 that "many doctors have, by ordering long rest-cures, laboratory examinations, consultations with absent specialists, &c., done everything possible to prevent or postpone the departure of conscripts. Last May 75% of the young men called up were certified as unfit." They have also resisted in other ways, by organising in groups which keep in touch with other resisters and publish illegal newspapers, and by refusing to participate in Vichy's plans for a corporate state. The Order of Doctors planned by Dr. Grasset, minister of health, has been a dismal failure. They have proclaimed in their underground newspaper *Médecin Français* that they will not remain scattered, without any organisation, but envisage the creation of a national front of doctors, united to resist all the measures of Laval and Hitler against the material and moral interests of the profession. In the same journal for last April we read: "When the priest and the schoolmaster, the doctor and the mayor, when the former socialist or radical, the ex-PSF and the Communist, the believer and the atheist, have joined in one committee to carry on the struggle against deportations and requisitions, have given shelter and food to franc-tireurs resisting conscription, when they have taken the same risks and known the same joys at successful action—then we may have confidence in the morrow. They will know, together, how to find just solutions for the problems, large and small, before our country."

Anger is felt at the suppression of most of the independent medical journals. "There is plenty of paper for the pseudo-scientific papers of Hitler's lackeys, and for the publicity sheets of the French disciples of the I.G. Farbenindustrie, but none for honest scientific newspapers." Another measure which has met with opposition is the demand by the Germans that doctors of clinics should name each new case of tuberculosis. Some doctors having complied with this order, a notice was put up on the entrance of the houses of the patients mentioned, and this is regarded as a flagrant violation of professional secrecy. It is not only in the underground press that such protests are made. Dr. Biot, a prominent Catholic physician, openly criticised the violation of professional secrecy in a book which was favourably reviewed in the *Petit Journal* last spring; and in the Catholic newspaper *La Croix* he recently took up a public stand against the "race theories" of selection. There is no doubt that the support for the doctors' point of view is so widespread that it is impossible to suppress it. But criticism and protest are not enough: things are getting more desperate every day, and the present winter, with physical stamina yet further reduced, increases the strain borne by the doctors of France.

On Jan. 26 the following were called to the bar at Gray's Inn: Captain A. R. Graham, RAMC, Dr. J. S. Cookson and Dr. H. G. St. M. Rees.

PALESTINE

AT the annual meeting of the Jewish physicians, held at Tel-Aviv, Dr. Citron discussed the education of Jewish medical students in the coming years. Presumably the universities of Central Europe will not provide many real opportunities for them, and the medical schools of Great Britain are already crowded. For some years, then, these students will be facing difficulties which he believes could best be resolved by opening a medical faculty in the Hebrew University at Jerusalem. Teachers should be chosen from among outstanding physicians and surgeons already resident in Palestine. Clinical experience could be gained at the large general hospitals at Tel-Aviv and Haifa. He favours the British type of medical course rather than the Central European type, and believes that teaching should be in Hebrew, but that students should know English and another European language.

American soldiers, treated by their own doctors, occupy a hospital which though built of crude materials achieves the expected high standards in scientific medicine and surgery. There are three large modern operating theatres for major surgery—one of which is reserved for septic cases—and a theatre for minor surgery. The X-ray and physiotherapy departments are well equipped and there is a good dental department. Experimental work on animals is forwarding the study of endemic diseases communicable by rodents and insects.

In England Now

A Running Commentary by Peripatetic Correspondents

"WHAT will happen to us after the war? Those left in Civvy Street will have more medical knowledge than us, and probably higher degrees. Is our patriotism then to count against us in the rush for good jobs? It's not fair." And so it goes on. Where will the Brave New Medical World be if this attitude persists? No, No! They've got it all wrong. After three years in the Service, "with plenty of time to read" (and think) I have found the answer. Perpend.

I started medicine early—too early—and for years devoted myself to the assimilation of specialised knowledge. What a brilliant fellow I was, and how I thrilled to the plaudits of my colleagues on qualifying a few years younger than them! Why, the possibilities were unbounded, the top of the tree was in sight! And how I cursed when called up and jolted into a non-medical and unappreciative world. What pearls before such swine! Yes, I even thought that. Then gradually, into the alcoholic reaction, the truth penetrated. I was a barbarian, illiterate, uneducated, unable to converse or even mix with my fellow men. In a member of an allegedly cultured profession such a state of affairs is intolerable and something had to be done about it. So much of the "plenty of time" is in fact spent reading—but hardly ever medicine, which has already had more than its fair share, and given its way would have kept me for ever from other fascinations. (Incidentally, why wasn't I told about them before? But that, again, is another story.) Moreover, one inevitably (albeit unconsciously) picks up useful stuff—administrative experience, knowledge of bureaucracy and the executive mind, and hosts of other things, including the valuable faculty of outrageous and quite unwarranted self-confidence (for which the Services have an apt if indelicate name).

Those in the Services need not worry. They will gain valuable qualities which will be lacking in the medical recluse. These will more than offset any clinical inferiority, which in any case will be relative and evanescent only. They will soon find their professional level again; those who were top-flight before still will be; and those who were dullards before probably will be again. It is reasonable to suppose that those responsible for handing out jobs after the war will be intelligent enough to realise this.

So take heart, you ambitious and embittered serving officers. Look at the successful teacher, consultants and practitioners of riper years. Many of them were

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junior medical officers in the last war, and see where it's got them.

* * *

"The present darling of the Departments," writes Ivor Brown in *Just Another Word*, "is Rehabilitation, a word originally applied to the restoration of a degraded man's rank and privileges. . . . A year or two ago nothing was mended, renewed or restored. Everything had to be reconditioned. Now reconditioning has been supplanted by rehabilitation which has the merit of being one syllable longer. . . . Will the next translation of the Bible be allowed to heal the sick? No, it will have to rehabilitate those who are suffering from psycho-physical maladjustment."

Yes, I'm on his side; who isn't? But of course it *is* convenient to have a word which means the whole process of getting the injured person back to work. "Rehabilitation" is an overtrimmed reticule for the neat smooth verbal counter "able." Meaning "fit," the word is current in "able-bodied" and "able seaman"; the man who is intellectually fit for his job is an "able" fellow. We have taken kindly enough to "disablement." What is the matter with *ablement*? Why not an abled man as well as a disabled one? Shut your eyes and repeat with me: "A disabled man, abled at an ablement centre and now pronounced able." Not too bad, is it? Or would you rather shut your ears too, and aspirate with Cockney liberality: "A dis-habled man, habilitated at a rehabilitation centre and now pronounced habile"?

* * *

One night early on in the war my car was stopped, as I thought, by two special constables, who jumping into the back seats asked to be dropped a little way up the road. No sooner had I started, and just as I became aware of an aroma of whisky, a threatening voice said, "Listen you, you're going to drive us to Buntonwell." I was terrified, and awaited with rapidly increasing pulse-rate the fractured skull with subdural hæmatoma which I knew was coming, being a regular cinema-goer. "Did you hear what he said?" roared the other gentleman in an Irish brogue, leaning over towards me. I replied at once and with obvious nervousness, "Yes, but it's 22 miles away and I am thinking how best to get you there." And I *was* thinking. I crossed the road suddenly and pulled up sharply by a tall figure standing in a doorway. In the faint light from the suburban police station I discerned boots which could only belong to Sergeant Proudfoot, to whom I had recently presented, in my capacity of chairman of the local horticultural society, a prize for monster radishes. "Certainly, sir. I'll see that these men get to the right place."

I vowed never to give another lift at night but repented once when I saw a soldier who looked tired out. No sooner was he in than he lapsed into coma, snoring deeply and exhaling the odour of a brewery. When I reached the innocent looking country house which provides refresher courses for commandos, to which I assumed he was going, I stopped and a corporal at the lodge lifted him out with commendable tenderness and understanding. By day my most interesting character was an agile middle-aged man with a reddish beard and piercing blue eyes who suddenly produced a chart of the North Atlantic and asked me if I would make up a party to go yachting round the coast of Greenland. Needless to say this was before the war. Oddly enough I don't think he was a psychotic but I have on other occasions unknowingly given lifts to two escaped lunatics.

My most difficult passenger was a boy of four just recovered from cerebrospinal fever. As he lived in my village I had offered to take him home, and the ward sister deposited him in the back of the car, propping him up in blankets. Half way along the straight main road which leads to the village 12 miles away, Percival intimated to me euphemistically that he was answering a call to stool. Opening what windows I could, I accelerated with some concern, trying to recall passages in the appendix of Mrs. Beaton which deal with the cleaning of leather upholstery. But nothing had become evident by either auditory or olfactory routes when a mile from home he murmured, "Mister, I want to be sick quick." Fortunately again he did not implement the sensation, and child and car were both unsoiled when the handing over ceremony took place.

Three invitees, all ladies, have offered to pay me the fare, another wrote to thank me for my kindness and one wept for gratitude. One market morning there was unpleasantness. I had already picked up a "regular," a deaf market gardener, who wasn't going quite all the way. At the next bus stop I offered to accommodate two, and at once three largish women scrambled in, pushing away my case and drum. I was prepared, if necessary, to overload the car, but I took a poor view of their behaviour when one of them railed at me for not turning out the man, whom they appeared to know, to let in Aunt Martha (circa 18 stone) and young Agnes. As they became truculent I became tough. "One of you get out, or all three of you get out," I said, "and no more in." One got out. There have of course been many pleasant incidents—the man who produced beer and sandwiches from an attaché case, the party of ATS girls who loaded me with pears, various invitations to tea, an offer by an undenominational to convert me. Some of my passengers have refused to leave me. One morning I developed a purpura of unusual distribution and confessed my alarm to my wife. "You needn't bother," she said, "I caught it in the bed this morning. Whom did you pick up yesterday?"

* * *

"You and your colleagues could do a nice job for the salvage," said the pharmacist, "and help us even more, if you would send your *BP* 1914, *BPC* 1923 and *NF* 1939 to be turned into shell-cases. You can add the *NWF* 1941 as well now, because it became obsolete on Feb. 1, when the 1943 edition came into force." "Would it make much difference?" I asked innocently. That touched him off all right. Boiled down and censored, his remarks amounted to the fact that a great deal of avoidable labour would be spared the pharmacist if doctors prescribed only modern formulæ and preparations, and a great deal of waste would be avoided at the same time, because the new *NWF* is designed to meet the peculiar shortages of war. "I wish you would tell your friends about it" he said, and I promised to do what I could.

* * *

The vaccinating doctor pays three visits.

House 1.—No thank you, we prefer the immunisation.

House 2.—Now can you tell me when we can have baby inhumanised?

House 3.—No, we don't agree with it, wait while I discuss it with my husband. . . . Well, as you are here you might as well do it. . . . That's a good job over. Tell me, what is this for?

Infectious Disease in England and Wales

WEEK ENDED JAN. 29

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 1928; whooping-cough, 2104; diphtheria, 777; paratyphoid, 4; typhoid, 2; measles (excluding rubella), 919; pneumonia (primary or influenzal), 1079; puerperal pyrexia, 167; cerebrospinal fever, 60; poliomyelitis, 4; polio-encephalitis, 2; encephalitis lethargica, 1; dysentery, 176; ophthalmia neonatorum, 65. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Jan. 26 was 1869. During the previous week the following cases were admitted: scarlet fever, 109; diphtheria, 37; measles, 39; whooping-cough, 78.

Deaths.—In 126 great towns there were no deaths from enteric fevers, 1 (0) from measles, 3 (0) from scarlet fever, 13 (3) from whooping-cough, 19 (0) from diphtheria, 48 (10) from diarrhœa and enteritis under two years, and 104 (16) from influenza. The figures in parentheses are those for London itself.

Birmingham reported 8 deaths from influenza, Leeds 5, Ilford 3, no other great town more than 2. The 3 fatal cases of scarlet fever were reported from Middlesbrough, Chesterfield and Stoke-on-Trent.

The number of stillbirths notified during the week was 220 (corresponding to a rate of 32 per thousand total births), including 25 in London.

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Parliament

ON THE FLOOR OF THE HOUSE

MEDICUS MP

THE House of Commons has this week been debating electoral reform and handing their views on to the Speaker's conference on Electoral Reform and Redistribution of Seats. It remains to be seen whether any change will be made in our customary method of voting and whether any redistribution will amount to more than cutting up overlarge constituencies like Hendon and Romford. But there will be other changes and the fact that the conference is to sit is an indication of a general election at a not too distant date. Another bill discussed is that which places an obligation on employers to reinstate former employees when they are discharged or demobilised from the Services or the civil defence force. The minimum period of reinstatement is to be 26 weeks if that is "reasonable" and "practicable." This is another attempt to put a foundation of security in the social structure.

In the House of Lords there has been a debate of first-class interest on the relationship between soil and health. The Earl of Portsmouth held the problem to be a fundamental part of the investigation being undertaken by the Royal Commission on population trends. Food, he said, was not only a munition of war but a munition of life and he took as the text of his speech the findings of the Peckham Health Centre. To feed families at the centre with ordinary shop-purchased food was not enough, "the vitality" was not there and the directors were forced to turn to their own farm and grow the food themselves. He drew a comparison between this experience and that of two farms in Holland which before the war were run on the line of creating humus from organic waste. The point of the story was that the food which was grown with an eye to its vitality and without the use of artificial fertilisers was so much better than other food that it was sold at 15–20% above ordinary market prices in a time of over-production. Lord Glentanar asked whether the balance of the population distributed between agriculture and industry was safe and proper, for only 6½% are on the land. The low fertility of urban families was disquieting. We might find that the study of the whole would show the well-being of man as of paramount importance and that economics must not usurp the central consideration. These two speeches were from the standpoint of the "compost school" and the supporters of artificial fertiliser respectively. Lord Hankey endeavoured to hold the balance and suggested that as soon as Lord De La Warr, who is chairman of the Agricultural Research Council, returned from his travels the "composters" and the "artificial fertilisers" should get together to meet the Agricultural and Medical Research Councils and agree on a line of research. Lord Geddes reviewed the history of the controversy which the dominance of the German school—Virchow, Schwann and Liebig—had made difficult to follow. Much had happened to shake the authority of the German teaching and Lord Geddes suggested that the contrary theory of Professor Béchamp of Montpellier that "little bodies" or microzymases are the basis of cell life should be referred to the scientific researchers. Lord Bledisloe said that in New Zealand some ailments are deemed to be traceable to soil or water deficiencies.

Lord Snell, replying for the Government, called attention to the fact that the largest families were always to be found in the poorer section of the community and that as the standard of nutrition rose there was a reduction in the size of families. It was, he said, the Government's view that there was no evidence of ill health in the community due to the use of artificial fertilisers and that scientific evidence pointed to no antagonism in agriculture between humus and artificial fertilisers, but to the beneficial results of both in their place at the proper time. But the cause of a falling birth-rate is not one thing, there are many factors. If the Royal Commission like to add to their labour a consideration of the problems brought forward in the Lords they may be able to do so. But Lord Snell pleaded for limiting their inquiries so that the work might be finished with due rapidity.

QUESTION TIME

Child Mortality in Scotland

Mr. G. BUCHANAN asked the Secretary of State for Scotland if he had considered the report of the committee presided over by Sir John Boyd Orr dealing with child mortality; and what action it was proposed to take.—Mr. T. JOHNSTON replied: On the day of publication, I invited the associations of local authorities and other interested bodies to consider the report with a view to discussions which I propose to open immediately. Preliminary estimates indicate that the infant mortality-rate, while still unsatisfactory, is likely to be lower in 1943 than it has ever been in Scotland.

Mrs. HARDIE: Will the Minister press local authorities to provide maternity accommodation immediately in view of the shocking housing conditions that exist?—Mr. BUCHANAN: Is the Minister aware that if this report applied to some other country this whole House would be shocked at the terrible state of affairs disclosed?—Mr. A. SLOAN: Is the Minister aware that the vital statistics and all material evidence have been at the disposal of the Scottish Office during his whole term of office?—Dr. EDITH SUMMERSKILL: Is the Minister aware that this is one of the few civilised countries in the world where no provision is made for the expectant mother in industry and that she is worn out even before her confinement?

Later Mr. EDEN, as Leader of the House, promised that time would be given for discussion at a later date.

Survey of Consultants

Sir DOUGLAS HACKING asked the Minister of Health whether he had considered the letter about consultant and specialist services appearing in the medical press of Jan. 15, signed by the presidents of the three Royal Colleges, in which it was stated that these colleges were, at his request, making a survey of the present availability of consultants and specialists; and whether, in view of misunderstandings that had arisen on this matter, he would indicate the purpose and scope of the survey.—Mr. H. WILLINK replied: As is generally known, surveys of the hospital services have been in progress throughout the country for some months, the aim of which is to assist in producing plans for the coördination of those services after the war by ascertaining the supply of and probable demand for hospital facilities, and by making recommendations for any necessary extensions and improvements. At an early stage of these inquiries it became clear that a very useful purpose would be served by the initiation of similar inquiries in England and Wales into the supply and distribution of consultants and specialists, and the probable demand for them in a comprehensive postwar hospital and consultant service. Arrangements were accordingly made with the presidents of the three Royal Colleges for a survey to be made of the existing consultant and specialist services in order to ascertain whether there was a surplus or shortage in any area, and whether redistribution would be desirable in any postwar hospital service. The Royal Colleges have, as already announced, established a Central Medical Academic Council, including representatives of the universities, to perform the necessary work at the centre, and area committees based on the universities to undertake the collection of information and preparation of lists locally. My predecessor invited the vice-chancellors of the universities to act as chairmen of these area committees. It is hoped that this survey will make available for the first time information about the numbers and types of consultants and specialists in the country. Information is already available about specialists in the Services.

Misunderstandings, the Minister continued, appear to have arisen owing to the fact that in order to arrive at the numbers and types of consultants and specialists, it is necessary to draw up lists of names. I am therefore glad of this opportunity of assuring the profession, and especially its members who are on war service at home or abroad, that such lists will be treated as strictly confidential, and will not be used as a test of eligibility for appointment as consultant or specialist in any comprehensive postwar hospital service. If, at a later date, it were thought desirable that consultant and specialist appointments should be restricted to persons qualified in some particular manner and enrolled on a list for the purpose, it would be necessary to provide for the establishment of a register on a statutory basis in a manner approved by Parliament.

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Overcrowding and Understaffing in London Hospitals

Mr. R. W. SORENSEN asked the Minister of Health for information respecting overcrowding and understaffing in hospitals in the London and Greater London areas.—Mr. WILLINK replied: I am advised that there is no appreciable overcrowding in general hospitals in these areas. When necessary, arrangements are made under the Emergency Hospital Scheme to transfer patients to outer hospitals for treatment. Owing to present conditions, overcrowding is unavoidable in a number of hospitals used for the treatment of the chronic sick and for mental cases. The Minister of Labour is taking steps to assist hospitals with staffing difficulties.

Mr. SORENSEN: Is the Minister aware that the nursing staffs in some hospitals are suffering from severe strain and that if he does not supplement them by other nurses many will break down under the strain?—Mr. WILLINK: We are all aware of the very great strain.

Production of Penicillin

Mr. D. ROBERTSON asked the Minister of Supply why his department was obstructing the visit to the USA of Mr. Gormley, of International Chemical Company, Ltd., London, whose associated companies in Canada and the USA rank as the largest manufacturers of penicillin and who were prepared to put all their knowledge and experience at the disposal of the British company so that large-scale manufacture of penicillin could be commenced at the earliest moment.—Mr. C. U. PEAT replied: Mr. Gormley has sought the support of the Ministry for his application for an exit permit to visit North America for the purpose of investigating penicillin production and for certain other purposes. In the absence of evidence that his visit would be likely to increase supplies of penicillin, I do not feel able to support his application. Technical experts are already visiting penicillin plants and mould culture establishments in America, and the information they obtain as to processes and equipment will be made available to any manufacturers in this country who satisfy the Ministry that they are in a position to undertake the production of penicillin.

Mr. ROBERTSON: Is it not a fact that Mr. Peat's department have granted a virtual monopoly of penicillin to three or four firms whose output is very disappointing—not one per cent. of the demand?—Mr. PEAT: We have not granted a monopoly to three firms. The production of penicillin at the present moment is in its infancy and is at an experimental stage. The patent rights and any other developments during the war have been pooled and will be made available to any manufacturer who is in a position to make penicillin.

Mr. CRAIK HENDERSON: Is the Minister aware that the production of penicillin in America is ahead of that in this country?—Mr. PEAT: The production in the USA is ahead of that in this country, but it is not adequate for the requirements of that country. We are making every effort to get information from the USA for use here.

AMERICAN-SOVIET MEDICAL SOCIETY.—This society, formed last autumn for the exchange of information between USA and USSR, held a meeting on Jan. 26 at the New York Academy of Medicine to discuss blood-transfusion techniques. It publishes bimonthly the *American Review of Soviet Medicine* and its president is Dr. Walter B. Cannon, professor emeritus of physiology at Harvard.

ASSOCIATION FOR SCIENTIFIC PHOTOGRAPHY.—Dr. Peter Kerley and Mr. A. L. Cranch, FRPS, are to be among the speakers at a meeting on mass radiography to be held at the Caxton Hall, Westminster, S.W.1, on Saturday, Feb. 26, at 2.30 PM.

ROYAL SANITARY INSTITUTE.—Sessional meetings will be held at the institute on March 1, when Mr. P. G. Shute, malaria officer to the Ministry of Health, will speak on indigenous malaria and mosquito control in England after the war; on March 15, when Sir William Savage will discuss current questions of milk-supply; and on March 28, when Mr. A. Longworth will give a paper on rational design of house plumbing. Those proposing to attend should notify the secretary at 90, Buckingham Palace Road, London, S.W.1.

Letters to the Editor

THE MEDICAL CURRICULUM

SIR,—Dr. Vines is apparently unaware of procedures which are already available for modifying the medical curriculum. He says, "the teachers are the slaves of the curriculum rather than its masters" and "there does not appear to be any machinery for removing anything from it." In London University the syllabuses of the various subjects in the MB course are drawn up by the relevant Boards of Studies. The members of these boards are the recognised teachers of these subjects. The teachers therefore control the syllabuses. This system at first sight appears ideal but it has its disadvantages. A teacher is too often obsessed with the importance of his own subject and tends to devise a syllabus and teaches subject matter with little regard to the later work of the student. The present subjects are usually taught in water-tight compartments, and until the barriers between the first year and intermediate years' studies, and those between the preclinical and clinical years, are broken down we can hope for very little advance.

As a lecturer in biology and a practising physician, I submit the following scheme, which should serve to remove much dead wood from the curriculum and at the same time give a course of study more related to the future practitioner's needs.

> The Board of Advanced Medical Studies, which is composed of teachers of clinical subjects, should meet and consider the syllabuses of the preclinical years. The members of this board are in the best position to know what should be taught in anatomy, physiology, biochemistry and pharmacology. Draft syllabuses should be drawn up and submitted to the Board of Intermediate Studies (which controls these subjects) for their consideration and approval. Similarly, the Intermediate Board should consider the first-year syllabuses and submit proposals for modifications to the Board of Preliminary Medical Studies—as in fact has recently been done. The clinical years' studies would best be considered by qualified men not actually teaching the subjects. A body of 12–20 intelligent general practitioners would certainly produce a more balanced and useful curriculum than the present one. The deliberations of these boards would be submitted to the Board of the Faculty of Medicine who would confirm or refer back to the boards the amended syllabuses.

Such a scheme has as an essential prerequisite the sympathetic reception of the draft syllabuses by the lower boards of studies. All teachers, preclinical and clinical, should discard their insular attitude to their subjects and work harmoniously together to produce not specialists in the individual sciences but good doctors.

E. IDRIS JONES.

St. Mary's Hospital Medical School, Paddington.

SIR,—Dr. Vines has touched on some vital matters for medical men of the future. It is not unthinkable that medical qualification in the future will be of two grades—one a qualifying diploma for general practitioners, and the other a qualification designed for aspirants in any kind of specialism. Confining attention at the moment to the former, it would be valuable to have the opinion of practitioners as to how medicine should be taught. This information could be gleaned by inviting them to answer a questionnaire as to what their own medical education had done to equip them for general practice. For example:

Question 1.—What parts of chemistry, physics and biology did you find of first importance when you took up the study of anatomy and physiology? And which parts were of no importance?

Question 2.—What parts of anatomy and physiology did you find of first importance when you entered the field of clinical studies? And which parts were of no importance?

Question 3.—What parts of these clinical studies did you find of first importance when you came to your work in general practice? And which parts were of no importance?

If the results obtained from say 1000 replies gave a clear indication that some parts of the subject at present

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taught were considered of no practical value to the general practitioner, it might make it easier for those more academically minded to drop them from the syllabuses for which they are largely responsible.

Medical School, The Middlesex Hospital. S. RUSS.

DISCIPLINED AGGRESSION

SIR,—A coward has often been defined as the man who is afraid of being brave. Like many definitions this does not convey the whole truth, but in recent writings on the war neuroses the aspect it presents has possibly been rather neglected, though often implicit. The man in a dangerous situation is not only afraid of the threat to his own security but also of the urge in himself to act aggressively against this threat and thereby possibly to increase the threat and fail to cancel out the danger. Aggression is part, perhaps the most normal part of the instinct of self-preservation; but because of our nature and nurture and the normal conditions of security under which we live, it may be too much repressed—and then flight or immobility may be the only reactions to a dangerous situation. Aggression is not self-assertion; aggression is largely selfless. The whole personality is concentrated for the time being on the object to be obtained; the overcoming of the threat to security, whatever the cost, even if it be life itself. Aggression is not, I believe, sadistic as is sometimes supposed; except under exceptional circumstances I do not think there is any pleasure-seeking aim in killing or maiming the opponent; the main thing in the aggression is the removal of the threat to security, whatever the price.

All this is well known, but another aspect may need stressing at the present time. All the training of the combatant forces in modern war depends upon the development of all the latent powers of aggression. Probably more than in any former war, swift, disciplined, trained aggression must be developed in every combatant, not only to win battles but to neutralise fear. At the end of the war these men will again be absorbed into civilian life, with their training and hard war experience of the value of aggression. They will be absorbed into all ranks of life, into all the professions including our own. Perhaps more clearly than many of us they will know what they want and be more ready to express it in words and deeds. I hope our politicians, sociologists and economists realise what a big influence these returning millions will have upon public life and opinion. They will not be satisfied easily with blue prints of post-war planning and reconstruction and will want deeds more than words. They will have learnt by hard experience that the heights of Pisgah are to be scaled and not looked at.

By those who have learnt to use aggression I do not mean unpleasant, self-assertive, aggressive people; I mean those with as great capacity for human love and sympathy as the rest of us—if not more—but aware that what they want for themselves and others is much more important than what they fear. It will not be life that matters but what they strive for.

London, W.1. MAURICE B. WRIGHT.

SHALL BASSINI DIE?

SIR,—Two letters in your issue of Jan. 29 pleased me. Mr. Greenwood's advocacy of filigrees for bad herniæ has my whole-hearted support. I started to use filigrees in 1913. For a few years, influenced by the claims of fascia, I abandoned them for no good reason. Since the appearance of Cole's article in the *British Journal of Surgery* I have been using them again. The method is quick and efficient. Objections to it appear to be mainly theoretical. Mr. Nuttall's letter encourages me to join forces in defence of Bassini. His operation may or may not be wrong in theory, but it works in practice, if carried out with care and intelligence. Hostile criticism is based on theory and on failures, many of which are the result of poor technique (see Colonel Patrick's article in the current number of the same journal). I use certain minor modifications which I need not describe now.

Before the last war I tried out the method of simple excision of the sac. Many patients were cured, but I found a disconcerting percentage of early recurrences, even in young men. About 1922 I started to use the Bassini operation in all adult males, supplemented by a filigree in some of the worst cases. (Incidentally I think two filigrees are only occasionally required.) By 1926 I was so pleased with my results that I followed up only the worst cases. In 72 of these, after two years, there were 4 recurrences: 17 of the 72 were direct herniæ, of which 2 recurred; one man, aged 81, who had a large direct hernia, was alive and sound at the end of two years.

After the RSM discussion of 1936, I followed up 100 consecutive operations in adult males. Twelve patients did not reply; among the remainder there were 5 recurrences. At that time I had abandoned the use of filigrees in favour of fascia from the external oblique. These figures are open to criticism in that inquiry was made by post and after an interval of only two years. On the other hand, when a large community is served by only one general hospital, the surgeon often has the opportunity to examine a successful case many years after operation, while the failures usually appear sooner or later.

My present opinion, based on operations which must run into four figures, is that the Bassini operation will cure most cases in fit men. Of the frail and the fat many will be cured, but the use of a filigree is advisable in these cases, especially if the hernia is direct.

Northampton, Bucks. C. C. HOLMAN.

HOME-MADE PENICILLIN

SIR,—Having established the feasibility and usefulness of "natural" penicillin dressings, we have now decided to concentrate for a short time on the production of a more potent growth of the mould. This therefore seems a suitable time for a brief account of our results to date.

To begin with the laboratory side: the strain of *Penicillium notatum* used appears to retain its bacteriostatic power after repeated subcultures. A three-day colony on nutrient agar produces a 22 mm. "halo," as indicated by streaking with *Staph. aureus*. Two other strains tested show slightly less activity. The production of yellow pigment is rather variable, influenced for example by the nature and reaction of the medium. There does not appear to be any relation between pigment production and bacteriostatic activity. Various modifications of the nutrient medium have been tried, and, although the information on this subject known to industrial firms is not available to us, we have obtained sufficient positive results to give dressings of increased bacteriostatic potency. It is hoped, though this does not necessarily follow, that such dressings will show increased efficiency as regards wound treatment.

On the clinical side results have been most encouraging, as the following brief case-notes show:

1.—Boy, aged 11 years, road accident. Abrasion 3 in. by 2 in. on cheek and one of same size on forehead; central areas deep and scored with cuts. Penicillin applied as first dressing. Changed once. Abrasions well healed in seven days. No sign of sepsis at any stage.

2.—Child, aged 3 years, scalds of arm. Second and third degrees. Penicillin as first dressing. Wound dry, free from infection and practically healed when dressing removed after a week.

3.—Man, aged 50, weight fell on foot. Deep abrasion and blistering of most of dorsum of foot. Penicillin applied as first dressing. Complete healing in ten days with no pus or other discharge.

4.—Girl, aged 14, scalds of thigh, area 10 in. by 7 in. Whole area of third degree with large patches of fourth. Treated for some days with flavine and tullegras. Dressing needed twice a day. Wound bathed in *Staph. aureus* pus at each dressing. Penicillin applied. Wound free from all trace of pus and covered with skin islands in four days. Subsequently the area healed over rapidly, being healed except for three small areas the size of shillings in ten days from the beginning of the penicillin treatment. These areas proved somewhat intractable and even spread a little in the next week. No actual sepsis developed, and the spread appeared due to the rather wet nature of the dressings. Flavine and tullegras were therefore substituted. The wound made rapid progress, but a return to penicillin once more halted the healing. Under tullegras and flavine the small areas left soon healed.

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5.—Woman, aged 50, scalds of breast. Large areas covering almost all breast. Slough size of hand over upper half. Middle section third degree only. This section healed well in a week with penicillin. Remainder free from slough and with no trace of pus or sepsis. Subsequent healing slow, although with complete absence of infection. With a change to flavine and tullegras, the whole area skinned over in a week. No grafting necessary.

6.—Man, aged 35, deep laceration of calf (air-raid injury), 7 in. long and involving two-thirds of the circumference of the leg. Soleus and upper half of tendo Achillis lacerated. Compound fracture of fibula. Penicillin dressings applied when wound was covered in sloughs. Rapid clearing up of sepsis with separation of sloughs. Wound completely healed in four weeks. Patient walking well.

7.—Man, aged 35, implantation dermoid of tibia (due to gun-shot wound received in Egypt two years before) with discharging sinus leading into the cyst. This lay in a cavity in the bone 1½ in. in diameter. Cyst removed and cavity packed with Bonney's blue. A week later cavity clean but dry walled and with no sign of healing. Packed with penicillin dressing. After a week wound almost healed. After two weeks narrow cleft ½ in. long and quite shallow all that is left to heal. No pus at any stage.

8.—Man, aged 45, cellulitis of shin. Large sloughing area 4 in. by 2½ in. bathed in *Staph. aureus* pus. Penicillin applied. Four days later no pus present. Two days later a well-marked growth of *B. pyocyaneus* developed and required elimination with acetic acid. A week later area healing and less than half former size. Free from infection.

9.—Man, aged 60, carbuncle of neck. Penicillin applied. Area of clean granulations in four days.

10.—Man, aged 50, varicose ulcer of leg. Ulcer 2 in. in diameter with surrounding weeping eczema. Trendelenburg operation with injection and cure of veins followed by six weeks' treatment by various methods. Ulcer showing no sign of recovery. Penicillin applied. Ulcer and all dermatitis healed and dry in a week.

In addition to the above, the dressing has been applied to septic fingers, groin abscesses after opening, bed-sores, septic amputation stumps, to a pedicle skin-graft near the anus where sepsis was already established (a case under the care of Mr. G. de Rynck, FRCS), and to other similar cases with equally good reslts. One failure only has been met with. This was a case of diabetic gangrene in a leg amputation stump; the gangrene spread and the patient died in coma.

At its poorest the dressing has proved the equal of any other in subduing and repelling septic infection of wounds. In the great majority of cases it has proved immensely superior to anything with which we are acquainted. With the more potent dressings we believe we shall soon have available, we hope to have even better results to report in a few months' time.

Some of the clinical work with penicillin has been carried out at the Battersea General Hospital, but most of the cases were treated at the Kingston County Hospital, and the investigation has been much assisted by the kindness of the surgical colleagues of one of us (A. J. H.) in placing their septic cases at his disposal. We wish to make the usual acknowledgments to the Surrey County Council and the Medical Superintendent of the County Hospital (Mr. H. A. Kidd) for permission to publish these results.

A. J. HOBSON.
L. D. GALLOWAY.

Wimbledon.

FAT DEFICIENCY AND SCURFY SKIN

SIR,—In her letter of Jan. 15 Dr. Smedley-MacLean mentions the suggestion (which has also been current in America) that margarine fat might be inferior to butter fat in respect of its linolic acid content. Andrews and Richardson (*Oil and Soap*, 1943, **20**, 90) determined the linolic acid contents of 227 samples of commercial edible fats purchased in retail shops in 7 large cities of the USA; these included various brands of butter, margarine (the fat of these being separated for analysis), lard and commercial shortenings made from (*a*) partially hydrogenated oil mixture, (*b*) highly hydrogenated oils blended with unhardened oils, and (*c*) mixed animal and vegetable fats. They found that linolic acid (of course in combination as glyceride) was present in all the fats, and indeed in greater proportion in commercial margarine and shortenings than in butter fat. The average percentage contents of linolic acid, expressed as glyceride, maximum and minimum figures being shown in parentheses, were: butter-fat 3·3 (1·4–4·8); margarine-fat 10·9 (1·3–23·4); lard 11·7 (6·5–13·7); shortenings (*a*) 12·7 (2·9–22·4); shortenings (*b*) 22·0 (4·7–38·2); shortenings (*c*) 20·6 (10·4–26·2).

London N.W.6. E. LEWKOWITSCH.

HEALTH IN AND OUT OF SCHOOL

SIR,—I should like to express my appreciation of your leading article of Jan. 29. It is refreshing to meet realistic comment upon the school medical service, with recognition of the fact that much of the treatment now provided in school clinics is of a kind that can be provided there in a more satisfactory manner than elsewhere.

The treatment required by school-children falls into six main classes. The first, domiciliary, is obviously the concern of the family doctor. The second, involving comparatively simple treatment of minor ailments over a period of days or weeks, could be undertaken as "surgery" treatment by the family doctor or could be carried out, as at present, by school clinics. Either course would be practicable: distribution as between family doctor and school medical service is a matter of local convenience rather than of rigid policy. The third class, hospital treatment, requiring resources, outpatient or inpatient, which only a hospital possesses, is self-defining.

The fourth class, treatment requiring the services of a specialist but not demanding hospital resources, is perhaps best typified by the treatment of defective vision and minor orthopædic defects. The school medical service has provided for the carrying out of this work either by the appointment of its own part-time specialists or, less commonly, by "farming out" the treatment to hospitals, and it seems plain that here also local resources and convenience will have to be the determining factors.

The fifth and sixth classes, institutional treatment with the provision of education (as in the prolonged hospital treatment of orthopædic defects) and treatment with an integral educational factor (as in speech therapy and certain aspects of child guidance), obviously require that the educational system shall have a large share in their organisation and practice, and there is no reason to question the propriety of their being part of the school medical service.

The basic task of the school medical service, therefore, is in the detection of defects at the earliest possible stage, or, better, the detection of a tendency toward the development of overt defects, and the classification of the child in order that he may be treated by the appropriate agency. This has in fact been the general aim of the school medical officer in the past, and the failure of the service to do maximum good has been due to three main causes—lack of facilities for treatment, lack of liaison between the SMO and the private doctor, and excessive reliance upon routine medical inspection.

The bill implies the remedying of the first, but the second is rather less tangible. Presumably any scheme for a comprehensive medical service will remove the financial causes of mutual distrust between the local-authority medical officer and the family doctor, but merely to take the school-child out of the SMO's hands or to bring the family doctor into the school medical service as a part-time officer is of little use. The local authority's service, the family doctor and the hospital must function as partners, with a free interchange of information and ideas, in order that any particular child may be treated by the right agency or combination of agencies.

We must not overlook the deficiencies in our system of routine inspection. At present the child is inspected three, or possibly four, times during his school life. During the three years between inspections the detection of defects depends upon rapid surveys by school nurses or upon the arousing of the suspicions of the teacher, and consequently it is quite possible for a defect to arise and become well established before it is discovered. There appears to be scope for supplementing, or even replacing, routine inspections by regular and frequent visits to

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the school by the SMO, who would encourage and assist the teacher to discover suggestive signs and symptoms, while sessions at the school clinics could be held for the investigation and classification of children suspected to be suffering from defects, who would then be referred to the appropriate agency for treatment.

This business of, as it were, prospecting for the earliest indications of departure from maximum health is not a simple thing which anyone with a medical qualification is able to undertake. During the past 30 years school medical officers—whose wisdom, incidentally, has brought them little material reward—have gradually raised it to the importance, if not the accorded status, of a medical specialty. The present is the time for the status to be accorded and for the school medical officer to become the valued collaborator, and not the rival, of the family doctor.

JOHN D. KERSHAW,
Medical Officer of Health.

Accrington.

FUNCTION OF STEROLS

SIR,—Major Torrie, in your issue of Jan. 29, says: "The vitamins have been called the external hormones" [and the camel has been called the ship of the desert, but why bring that up?], "and thiamine (B_1) is specially concerned with glucose metabolism. The sterols including testosterone have a similar function." Psychiatrists deal, of course, with spheres of thought beyond the reach of many of us. One struggles to keep up, but even in one's own subject their ideas may bounce too high for one to follow. Will Major Torrie please explain in what respect the functions of some of the common sterols (say cholesterol, calciferol, testosterone, œstradiol, corticosterone and digitalis) are similar to those of thiamine?

RAYMOND GREENE.

Whitchurch, Bucks.

EXAMINATION FOR D Phys Med

SIR,—Para. 7 of EMS Memo No. 6 on "The Organisation of a Hospital Rehabilitation Department," issued last week by the Ministry of Health, reads:

> "Wherever possible, it is desirable that the various activities connected with rehabilitation should be under the personal supervision of a single member of the medical staff, whose duties include the maintenance of general oversight of the exercises, etc., given to patients, the prompt examination of anyone complaining of pain or other unfavourable reaction, and the holding of regular conferences with members of the rehabilitation staff. Such supervision is essential to success, and in no sense interferes with the continuity of control exercised over the individual patient by the original physician, surgeon or obstetrician who orders rehabilitation therapy, and with whom the medical supervisor works in close association."

In connexion with this, it is pertinent to point out that this Board has recently published the regulations for a diploma in physical medicine, granted jointly by the Royal College of Physicians of London and the Royal College of Surgeons of England (D. Phys. Med., RCP&S Eng.)

These regulations, copies of which may be obtained post free from me, provide that

> (*a*) the examination is open to practitioners of not less than three years standing, who have held recognised hospital appointments, and have completed a course of full-time special study extending over twelve months;
>
> (*b*) the whole examination which is divided into two parts must be taken in the first instance, and subsequent admission to Part II is, of course, dependent on success in Part I.

A syllabus indicating the scope of the examination is published in the regulations.

Since there may be candidates whose experience, either in one of the Services or in the EMS, during the last three or four years, may justify their admission to the examination under regulation 6, arrangements are being made to conduct the examination for the first time in July next. Applications for admission to this examination, accompanied by original certificates (which will be returned) setting out the experience on which the application is based, must reach me not later than Friday, June 16.

HORACE H. REW,
Secretary, Examining Board in England.

Queen Square, W.C.1.

NAIL-PLATE FOR PERTROCHANTERIC FRACTURES

SIR,—I have been much interested in Mr. McKee's article of Jan. 29. A great deal of useful work has been done on such nailing methods in the United States. One should mention particularly Neufeld and Austin Moore. Following on the work of these people I also have developed a one-piece nail, which, in spite of what Mr. McKee says, has I think some real advantages from a mechanical point of view over a two-piece instrument dependent on a coaptation screw and having such a thin upper end to the lateral plate.

Instead of a trifin nail the portion which penetrates the neck of the femur is V-shaped and is so made that a screw-threaded punch can be applied to the junction of plate and nail, which much facilitates insertion. Furthermore it avoids the well-marked projection of Mr. McKee's nail from the side of the femur, and the plate does not extend so far down the shaft of the femur.

It is very important that some standardised form of instrument of this or Mr. McKee's type should be developed, for the transtrochanteric fracture blocks hospital beds for long periods and has a poor prognosis for union in perfect position, even though the initial reduction may be satisfactory.

This modification of the Neufeld nail is going to be made on a commercial basis by Messrs. Down Bros. but it is obviously still in rather an experimental stage. My reason for bringing it forward now is the hope that one or two other fracture centres will use it, so that we may before long have the perfect instrument. I have a feeling that Mr. McKee's plate, good as it is, will not stand the test of time.

My nail-plate has been made by Mr. F. W. Suter of the Princess Elizabeth Orthopædic Hospital Workshops.

NORMAN CAPENER.

Exeter.

SULPHONAMIDES AND GONORRHŒA

SIR,—Dr. Harkness in his letter of Feb. 5 quotes as follows from the MRC Memo No. 10, on the medical use of the sulphonamides.

> The final tests for cure should be made not less than 3 months after suspension of treatment, and should include the gonococcal complement-fixation test and a serum test for syphilis (p. 23).

He then says:

> "It is now my considered opinion after experience covering a large number of cases that final tests may be safely carried out 14 days after completion of treatment. Of the tests mentioned above, the gonococcal complement-fixation is useless; the second should always be carried out during the early stages of treatment."

Apart from the doubtful truth of his dogmatic and unqualified statement, that the gonococcal complement-fixation test is useless, he makes an unfair and illogical comparison between the memo's test of cure 3 months after treatment and his own 14 days after treatment. If a gonococcal complement-fixation test is performed 14 days after treatment, the result, whether positive or negative, is devoid of significance in the present state of our knowledge. This is not the case, however, if the test is performed 3 months after treatment. Furthermore, while a serum test for syphilis 3 months after treatment for acute gonorrhœa is regarded as sound practice by the majority of venereologists, Dr. Harkness contents himself with recommending that a serum test "should always be carried out during the early stages of treatment" and says nothing about a later test.

Of such is—undetected syphilis!

F. R. CURTIS.

London, E.C.2.

THE 'Monoject' ampoule syringe, made by Burroughs Wellcome and Co., is a collapsible tube containing a sterile solution of morphine or other drug, with a sterile hypodermic needle mounted in the nozzle. The needle is protected by a plastic cap which screws on to the nozzle of the tube. The entire output of these syringes is temporarily reserved for the Armed Forces.

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Obituary

MAXIM EVNINE

B M OXFD

Captain Evnine died in Italy on Dec. 6, while serving as medical officer to an infantry battalion. Born in Moscow in 1918, he came to this country when 18 months old. From early school days he won a succession of scholarships, first at St. Paul's, then at New College, Oxford, where the Warden spoke of his "brilliant promise," and finally at the London Hospital, whence he graduated in 1942. His knowledge of Russian enabled him to give useful help to the Anglo-Soviet Medical Council in translating parts of the Review of British War Medicine. After a house appointment at King George V Hospital, Ilford, he joined the Army in August of the same year. He was RMO, successively to two battalions, with such success that his commanding officer wrote: "He was the ideal medical officer: no trouble was too great for him, and he was liked—a difficult feat—by both officers and men. We all had great faith in him." Max Evnine's short life, says a colleague, was characterised by a deep sincerity and purpose, all of which he hoped to crystallise in his medical work.

THE LATE PROFESSOR TOPLEY

Sir Joseph Barcroft writes: The Agricultural Research Council has now had three secretaries, all of high scientific eminence but with very different backgrounds in other respects. Sir William Dampier was and is a physicist, a scientific historian and an experienced and enthusiastic farmer on a considerable scale. Sir Edwin Butler was a botanist with a distinguished career in India behind him. Topley possessed neither the practical farming experience of Dampier nor the botanical knowledge of Butler. It was a bold experiment indeed to place a pathologist in the secretary's chair at the Agricultural Research Council. Nevertheless it must not be forgotten that the work of the council deals not merely with botanical problems—important as they are—but also with animal nutrition, and perhaps the most delicate work of the council is on the side of epidemiology. Some of Topley's first work indeed consisted in the overhauling of substantial researches that had been presented to the council in the years before he came into office on the subject of cattle diseases—such as those which were either tuberculous in nature or not widely separated from tuberculosis, and mastitis. This in itself was a great service.

Apart from the difficulties inevitably associated with the novelty of Topley's being a bacteriologist rather than a botanist or a farmer, he had to face others. In the first place the chairman, Sir Thomas Middleton, who earlier would have been a tower of strength in assisting new secretary through his teething troubles, was almost continually laid aside through illness, and while Topley had the most efficient and loyal help from his junior staff, he was deprived of the day-to-day assistance which Middleton had both the knowledge and the will to give.

Again at the commencement of Topley's term as secretary the whole administrative relations between the Agricultural Research Council and the Department of Agriculture underwent a change, in the general sense that the Agricultural Research Council was entrusted with enlarged funds of its own and was put on to the same footing as the Medical Research Council and the Department of Scientific and Industrial Research. The negotiations involved in this alteration required qualities of the highest character on the part of the secretary and went through with entire satisfaction to all parties. Again, the fact that we were in the middle of a world war made matters no more easy for the secretary, as he had to make rapid judgments, demanding great courage, on the curtailment of work on some problems and the initiation of work on others.

In looking back over what Topley did, three qualities stand out. Firstly, the vision with which he initiated new research of a fundamental character, getting help from persons of high scientific standing for the purpose, as for instance his establishment of a unit of soil enzyme chemistry at Rothamsted. Secondly, the tact with which he dealt with difficult administrative situations. Thirdly, the fact that he was not afraid to embark on programmes involving great outlay of money where he thought the importance of the information to be obtained demanded the expenditure.

During his few years as secretary, Topley's work was being more and more appreciated by all who came in contact with it and there are none who will not regard his sudden departure as a national disaster.

Notes and News

NEW PLANS FOR NURSES AND MIDWIVES

HOSPITALS training nurses will be affected by a new requirement of the Minister of Labour, designed to distribute qualified nurses more fairly over the various branches of the nursing service. On the advice of the National Advisory Council for the recruitment and distribution of nurses, the Minister has ruled that immediately on registration all nurses (apart from a few exceptions which he defines) shall enter one of the fields of special shortage, either for a year of service or for a course of training. This will have a double advantage: it will immediately and greatly increase the proportion of trained staff in these special fields, and it will introduce young nurses to professional opportunities and experiences which they do not encounter in the ordinary way. At first sight they may find the requirement formidable; but wider knowledge, within the profession, of life in the special hospitals and services cannot fail to benefit British nursing as a whole.

The branches open to them are midwifery, mental nursing, tuberculosis nursing, fever nursing, district nursing and nursing of the chronic sick. Provided there are vacancies, the nurse will be able to choose her special service, but she will not be compelled to remain in that field at the end of a year unless she has entered on a course of training, in which case she will be expected to complete it.

The shortage of midwives, though still serious, is beginning to be a little less acute. Last September the Minister announced that all newly qualified midwives would be required to practise for at least a year. This has helped to relieve the strain; in addition, many retired midwives have returned to practice and the numbers of recruits have increased. After May 31 he hopes to relax the order under which practising midwives are at present prevented from transferring to other fields of work or from seeking further training.

MOSQUITOES IN THE PACIFIC

TROOPS operating in the Pacific are not only themselves in danger from malaria but may be the cause of malaria in regions hitherto immune. In the Fiji, Tonga, Cook, Loyalty, Gilbert and Ellice groups of islands, and in Samoa and New Caledonia, anopheles mosquitoes are unknown, though in some of the islands west of Fiji they are common and malaria is prevalent. Normally ships trading between the islands are few and there are no air services. Now, however, there is a risk that men who have been exposed to infection may be transferred to islands where malaria is not endemic. Sea and air transport will serve mosquitoes as well as men, and infected female mosquitoes arriving by either route may start a colony in a malaria-free island by laying their eggs in some undrained ditch. Moreover, as it is, some islands in these regions breed the appropriate mosquitoes and would readily become established centres of infection.

Malaria is already endemic in New Guinea, New Britain and the Solomons, and is of course affecting the troops of both sides. The Colonial Office hopes to forestall the malarial invasion of fresh islands by a campaign against mosquitoes throughout the South-west Pacific. Experts consider that quarantine measures alone will not suffice—that it is necessary to get rid of possible breeding places before dangerous mosquitoes are introduced. Entomological surveys near shores and ports, and surveys of potential breeding grounds, will be followed by clearing, draining and oiling where necessary.

The scheme will be financed under the Colonial Development & Welfare Act, 1940, and an initial grant of £65,000 has

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been made for the first three years. This grant will cover cost of transport vehicles, garages, laboratories, equipment and tools, and salaries of staff, including engineer, surveyors overseers, clerks, drivers and labourers. The campaign will also be directed against mosquitoes other than anopheles, including carriers of dengue and filariasis, and potential carriers of yellow fever.

ANIMAL CARE

THE annual report of the Universities Federation for Animal Welfare as usual records a year of sensible measures for the protection and advantage of wild and domestic creatures. Without taking sides in controversy about experiments on animals UFAW notes that the numbers of animals used for this purpose have increased steadily during the past 67 years; that though many of them are not caused any suffering, some experience various degrees of it, even in England; and that in most foreign countries experiments on animals are not restricted. The federation finds that many laboratory workers are keenly anxious to give their animals as much consideration as possible, and many of them have accepted copies of Prof. J. G. Wright's book, *Veterinary Anæsthesia*. A practical book on the care of small animals is now being compiled by the federation.

Replies to a questionnaire sent to natural history societies give no grounds for fear that pests officers are destroying harmless animals wholesale; though of course traps inevitably catch some creatures for which they were not set. A leaflet has been published by the federation on trapping by public authorities, and public interest in humane methods of trapping is being sought. Lectures have been given on birds, tame rabbits, the pig and the sheep. The film library has not grown but the 13 films have been in active use during the year. Fougasse has done another poster which has been printed and displayed in provincial omnibuses by Messrs. Thomas Tilling Ltd.; and a leaflet, *Expounding Justice* by Fougasse and Major C. W. Hume, is being circulated.

Apart from all this, UFAW is trying to build up a strong fighting fund so that it can expand its activities rapidly when peace comes. Those who wish to contribute should write to Dr. F. Jean Vinter, the secretary, at 284, Regent's Park Road, London, N.3.

Royal College of Physicians of London

Dr. A. H. Gale will deliver the Milroy lectures on Tuesday and Thursday, Feb. 22 and 24, at 4 PM. His title is a century of changes in the mortality and incidence of the principal infections which cause death or disability in childhood.

Royal College of Physicians of Edinburgh

At a quarterly meeting on Feb. 1, with Dr. A. Fergus Hewat, the president, in the chair, Dr. Donald Stewart (Birmingham) and Dr. Alexander Brown (Edinburgh) took their seat as fellows. Dr. Duncan Macmillan (Nottingham), Dr. R. E. Verney (Edinburgh) and Dr. J. J. M. Jacobs (London) were elected to the fellowship.

Mr. Norman Dott was appointed Morison lecturer, and Dr. A. Rae Gilchrist George Alexander Gibson lecturer, for 1944.

Medical Society of London

At a meeting to be held at 11, Chandos Street, London, W.1, at 4.30 PM next Monday, Feb. 14, Air-Marshal Sir Harold Whittingham will read a paper on the contribution of the RAF medical services towards the war effort.

Association of Scientific Workers

Mr. P. M. S. Blackett, FRS, Langworthy professor of physics in the University of Manchester, has been appointed president of this association, which now has a membership of nearly 15,000.

British Institute of Radiology

At 32, Welbeck Street, London, W.1, on Friday, Feb. 18, at 2.30 PM, there will be a meeting of medical members, and on Saturday the 19th, at 2.30 PM, an ordinary meeting at which Dr. Norman P. Henderson will speak on the value of the opaque enema and its modifications.

Faculty of Radiologists

At 32, Welbeck Street, on Saturday, Feb. 19, at 10 AM Dr. L. G. Blair, Mr. T. Holmes Sellors, and Dr. L. E. Houghton will open a discussion on lung abscess.

Royal Air Force

The following consultants in the Medical Branch, Royal Air Force, have been granted the acting ranks stated:

Air Vice-Marshals A. F. Rook, OBE, (medicine); G. L. Keynes (surgery); and C. P. Symonds, CB, (neuropsychiatry). Air-Commodore T. C. St. C. Morton (pathology and tropical medicine). Group-Captains J. F. Bromley (radiology); C. W. Flemming (additional consultant in surgery); T. K. Lyle (local consultant in ophthalmology, overseas); G. L. M. McElligott (venereal diseases); F. W. Roques (gynæcology); and R. R. Trail, MC, (mass radiography and tuberculosis).

Broadcast on Immunisation

In a talk in the BBC Home Service at 7 PM on Sunday next, Feb. 13, the Radio Doctor will deal with Immunisation.

De Fabrica

A small exhibition of 35 items is on view in the Hunter room of the Hunterian Museum, University of Glasgow, to celebrate the 400th anniversary of the publication of the *De humani corporis fabrica* of Andreas Vesalius. It includes two copies of the 1543 edition of the *De Fabrica*, two copies of the *Epitome*, also published in 1543, and three examples of the *Opera Omnia* edited by Boerhaave and Albinus and published at Leyden in 1725.

THE British insulin manufacturers announce that the prices of all brands of unmodified and modified insulin are to be reduced on Feb. 14. The reduction is the result of technical progress leading to an increase in the yield of insulin from pancreas.

CHESEBROUGH Manufacturing Co. Ltd., have sufficient stocks of 'Pineoleum' inhalant, with or without ephedrine to meet doctor's prescriptions.

I LOOK forward to the day when the district nurse will become more of a health ambassador in the homes of the people and less of a warden of the sick—Dr. ANDREW DAVIDSON, chief medical officer, Department of Health for Scotland.

Births, Marriages and Deaths

BIRTHS

BABINGTON.—On Feb. 3, at Leicester, the wife of Lieut.-Colonel G. C. Babington, RAMC—a daughter.
BONE.—On Jan. 30, the wife of Alan W. Bone, FRCS—a daughter.
EVANS.—On Jan. 31, at Windsor, the wife of E. Stanley Evans, FRCS—a son.
FATTI.—On Jan. 28, at Uxbridge, the wife of L. Fatti, FRCS—a son.
GOSSET—On Jan. 22, at Oxford, the wife of Wing-Commander I. H. Gosset, RAFVR—a daughter.
HESKETH.—On Feb. 1, at Guildford, the wife of Lieut. J. C. Hesketh, RAMC—a daughter.
MOSELEY.—On Jan. 29, at Horncastle, the wife of Major J. H. Moseley, RAMC—a daughter.
O'CONNOR.—On Feb. 1, at Launceston, the wife of D. M. O'Connor, FRCSI—a daughter.
WATSON.—On Jan. 27, at Inchstellie, Morayshire, the wife of Squadron-Leader John Watson, RAFVR—a daughter.

MARRIAGES

MILLER—LAWES.—On Feb. 4, at Hampstead, W. B. D. Miller, DSC, surgeon commander RNVR, to Mrs. M. Lawes, superintendent WRNS.
WINN—NEVILLE-JONES.—On Jan. 29, at Birmingham, John Michael Winn, lieutenant RAMC, to Celia Neville-Jones, MRCS, widow of Roland Neville-Jones, major RAMC.

DEATHS

ALCOCK.—On Feb. 1, at Oulton Cross, Staffs, Reginald Alcock, CBE, MB VICT., FRCSE.
ARDAGH.—On Feb. 3, at Haslemere, William A. Ardagh, MD DUBL., aged 82.
CAMMOCK.—On Feb. 4, at Oldham, W. Rome Cammock, MB GLASG., FRCSE.
HANKEY.—In January, of typhus, in China, Donald Hankey, MRCS.
HAWKES.—On Jan. 29, at Wonersh, Guildford, Lewis Arthur Hawkes, MD EDIN, aged 83.
HINDS.—On Feb. 5, at Worthing, Frank Hinds, MD LOND, aged 82.
KELLGREN.—On Jan. 31, in London, Arvid Ludvig Kellgren, MD EDIN., aged 87.
KNOWLES.—On Feb. 6, Frances Ivens Knowles, CBE, MS LOND., CH M LPOOL, FRCOG.
NOTT.—On Feb. 1, at Guildford, Herbert Walter Nott, MRCS.
STEWART WILSON.—On Nov. 2, 1943, at Durban, Alexander Stewart Wilson, MB GLASG., FRCSE, FRCOG, aged 59.
WARE.—On Feb. 3, Henry Samuel Ware, MB CAMB., of Worthing, aged 79.
WHITE-COOPER.—On Feb. 3, George White-Cooper, MB CAMB., MRCP, of Bourton, Dorset.
WINTER.—On Jan. 29, Geoffrey Winter, MRCS, of Banstead, Surrey.
WOODRUFF.—On Jan. 29, John Winthrop Woodruff, MRCS, aged 93.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export.

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FRACTURES OF THE FEMORAL SHAFT

MECHANICS OF REDUCTION AND FIXATION

JOHN CHARNLEY, M B MANC, F R C S
MAJOR RAMC; SURGEON AT AN ORTHOPÆDIC CENTRE, MIDDLE EAST FORCES

THIS paper analyses the mechanical factors underlying reduction and fixation of fracture of the femoral shaft, and describes a system assembled from those parts of existing methods of treatment which seem to satisfy this analysis.

In the reduction and fixation of this fracture there are three requirements: (1) correction of shortening; (2) correction of angulation and lateral displacement; (3) immobilisation of the reduced fracture. Traction by itself can both correct angulation to some extent and produce some degree of fixation. Local fixation of the fracture, on the other hand, by reducing spasm spares the traction force. Local fixation can also be designed to assist in correcting deformity, and thus again spare traction force.

A sound method for treating this fracture must use these forces synergically, so that each spares the other. It will therefore be found that those methods in which traction is used as the principal corrective force are essentially unsound, and are particularly prone to allow of late deformity when the initial traction force is reduced to physiological levels.

Correction of Shortening

This is obtained by the application of traction, together with equal and opposite countertraction, to the muscles of the thigh. Traction may be either sliding or fixed.

SLIDING TRACTION

Sliding traction is used with the knee flexed, and is generated by weights and pulleys. The limb is cradled in a Thomas splint, suspended to a Balkan beam, slung by the Hamilton Russell method, or placed on a Braun splint. Fixed traction can be applied in only one way, and that is by the use of the straight Thomas bed knee-splint with skin or skeletal traction, in accordance (except for minor details) with the method devised by H. O. Thomas many years ago.

The essential feature in sliding traction is that the tension in the apparatus is governed by the amount of the weights, and thus does not necessarily agree with the demands of the muscles at any particular moment. It rests with the surgeon to judge how much weight to use and for how long. It is not an uncommon sight to see femurs after ten or twelve weeks still under about 10 lb. weight traction. It is customary to effect a slow reduction under weight traction, and when first applied the weight has to be in excess of the spasm which its application evokes. When should the weight be reduced? The logical answer is given by the tape-measure or the X rays. With the knee flexed to 45°, the tape-measure is useless, and X-ray control is effective only if there is no time-lag between any alterations and the observation of its result.

It is impossible to lay down a graduated scale for guidance in the use of weight traction. Some fractures, particularly battle casualties, can be overdistracted even on simple skin traction. Two apparently similar *closed* fractures may need very different initial traction; thus one may resist 25 lb. while the other may be grossly overdistracted by this amount. The explanation of this discrepancy in *closed* fractures depends on the conditions inside the fascial envelope of the thigh. The fascia lata is an inelastic capsule which extends from the pelvis above to the coverings of the knee-joint below. The degree of extension which any given weight will produce depends therefore not only on the tone of the muscles, but on the bulk and compressibility of the contents of this capsule. As the capsule is lengthened it must, being inelastic, decrease in diameter. A closed fracture of the femur may easily be accompanied by one or two pints of internal hæmorrhage within the thigh. Under these conditions no ordinary traction force can secure full length until the blood has disseminated throughout the thigh (fig. 1).

It is the influence of this inelastic capsule of the thigh, especially in transverse fractures, which is likely to lead to failures in cases treated throughout on fixed traction. Many of these fractures become resistant to extension in a very short time. During the first two weeks, as the resistance offered by the turgid capsule of the thigh diminishes, the resistance offered by the advance of soft tissue healing increases, and it is only by using heavy weight traction that full length is restored at the precise moment when both these factors are at a low level. It is suggested therefore that the closed transverse fracture with a swollen thigh is the only absolute indication for sliding traction.

FIXED TRACTION

Under fixed traction, unlike sliding traction, the tension in the system at any particular time is governed by the demands of the muscle, because it is produced by the muscles and not by the surgeon.

In this method it is necessary to secure full length under anæsthesia with complete relaxation of the thigh muscles, and length is then maintained by fixing the traction cords to the foot of the splint. The side bars of the splint offer excellent fixed points from which to provide local fixation to the fracture site, and on recovery from the anæsthetic the fracture is therefore immobile and the returning spasm therefore minimal. From this moment onwards the tension in the apparatus diminishes progressively and is never more than is called out by muscular tone. This is clearly demonstrated when fixed *skeletal* traction is used in the manner to be described later, for here there is no slip or stretch in the system which might explain any loss of tension in the traction cords. Used in this way it has been found that the tension cords of the fixed skeletal traction are very tight for a few days after reduction, and moderately tight for three weeks; thereafter the tension is so low that it is difficult to estimate its amount. Yet this low traction (of the order of 1–2 lb. after a month) is capable of resisting the tone of the muscles. The reasons for this are that: (*a*) the traction in this method is not being used to correct deformity or produce fixation; and (*b*) the scar tissue round the fracture is becoming strong enough to resist the tendency to shortening.

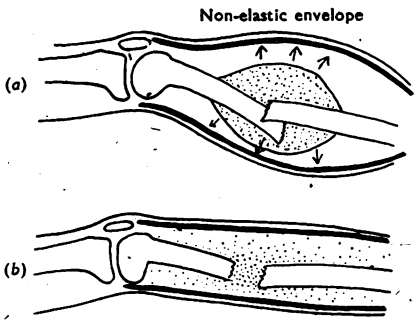

Fig. 1—Non-elastic envelope: (*a*) 30 lb. first day, large recent hæmatoma, bulky muscles; (*b*) 30 lb. third week, hæmatoma dispersed, muscle bulk less.

EFFECT OF TRACTION ON THE KNEE-JOINT

So many factors affect the recovery of function in the knee-joint after a fracture of the femur that the ill effects of long-continued weight traction cannot be decided on clinical grounds. This does not diminish the importance of the theoretical matters now to be discussed.

When skeletal traction is applied to the tibial tubercle it is not commonly realised how the physical state of the great ligaments of the knee-joint varies at different stages of union.

Consider the case (fig. 2*a*) of a fresh fracture of the femur under very heavy weight traction from the tibial tubercle—i.e., hypothetical case of 70 lb. at seven days. The muscles against which this force is expended are the quadriceps femoris, the hamstrings, and the lower fibres of the adductor magnus. Of these the greater bulk—the quadriceps and hamstrings—take the stress directly because they are inserted into the tibia. Therefore *as long as the fracture is recent and mobile*, the only tension in the ligaments of the knee-joint is that produced by the lower fibres of the adductor magnus. It can be seen therefore that violent traction during the first two weeks is unlikely to cause any damage to the knee.

Consider now the case (fig. 2*c*) of the long operation of slight weight traction after the fracture has become "sticky"

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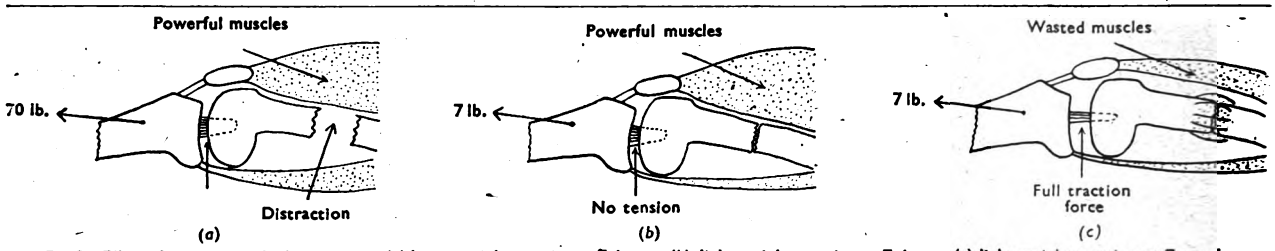

Fig. 2—Effect of traction on the knee-joint: (a) heavy weight traction at 7 days; (b) light weight traction at 7 days; (c) light weight traction at 7 weeks.

or even clinically firm—i.e., 7 lb. at seven weeks. The muscles are weak and of poor tone, and the greater part of this traction is being expended on the hardening callus. In this case the ligaments of the knee-joint are probably transmitting more tension than they would in the first two weeks when the fracture is mobile (fig. 2*b*).

OVER-DISTRACTION AND UNION

Over-distraction due to the injudicious use of weight traction, and its evil effects on union, is a subject on which much clinical evidence can be produced. Early union means more perfect ultimate return of knee movement, and it is more blessed to have a normal knee-joint than a leg of the right length with a feeble joint. Perhaps the most that dare be said is, that if surgeons were less afraid of ¼ in. of shortening, and more worried by ⅛ in. of over-distraction, better results would be obtained. Fixed traction scores heavily over weight traction in this, in its application to the femur.

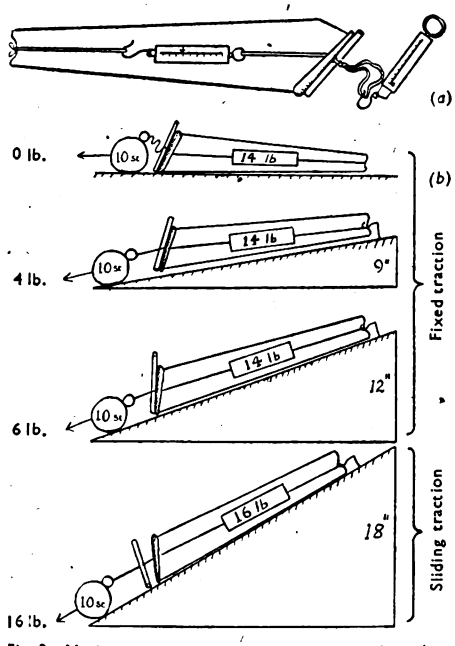

Fig. 3—Mechanics of fixed traction combined with graduated sliding counter-traction: (*a*) working model; (*b*) effect of raising foot of bed on fixed traction.

COUNTER-TRACTION

In whatever way traction is applied to the distal part of the limb, an equal and opposite amount of counter-traction must be available to the proximal fragment. Countertraction can be obtained from body-weight, or from the counterpressure of the ring of the splint against the tuber ischium. Countertraction by body-weight is applied by raising the foot of the bed on blocks, which should be sufficiently high to keep the patient against his back rest. With weight traction nothing more need be known about it as long as it is greatly in excess of the traction force.

It is of interest to observe how varying degrees of countertraction can be produced by different degrees of tilt of the bed; to measure these it is essential to have the patient lying quite flat on a hard bed without backrest or support under his shoulders. In a rough practical test, using a spring-balance between one ankle and the bed rail, the following approximate tensions were recorded in the case of a 10-stone subject:—

Height of block (inches)	Traction force (lb)
6	4
9	6
12	12
18	20

Countertraction by ring of splint is usually criticised on the grounds that: (*a*) the skin over the tuber ischium cannot be expected to survive the necessary pressure; (*b*) the ring of the splint is usually too large and bears on the perineum, which therefore reduces fixed traction to a misnomer.

All these objections are justified when very powerful traction is used; and even if the ring of the splint were to fit with the perfection of a calliper, the use of powerful traction would result in harmful "plugging" of the thigh into the ring. But most fractured femurs do not require powerful traction. Those which do—the "non-elastic capsule" cases—are more logically treated with an initial week or two on weight traction. But these objections are not justified when moderate traction is used, and the average limb on recovering its muscle tone after the relaxation of the anæsthetic does not generate a violent traction force. *The commonest source of failure with fixed traction is the attempt to secure day-by-day reduction without anæsthesia.* The unpopularity of fixed traction in many quarters is due to its association with skin traction in the hands of an unskilled ward staff.

In the system to be described *fixed skeletal traction* is used primarily for comfort, precision, and simplicity of nursing, and *not* for enhanced traction force.

To reduce discomfort from the pressure in the region of the tuber ischium, it is a common practice to anchor the foot of the splint to the bed rail, and to raise the foot of the bed on blocks. It is usual to regard this as a sign that the principles of fixed traction have been given up, for it is argued that in these circumstances the fracture is under the sliding traction of body-weight. To understand that the essentials of fixed traction are in no way altered by this manœuvre can best be appreciated with the aid of a practical model. A spring-balance is stretched between the foot of a Thomas splint and a large wooden spreader which is arranged to straddle the ring of the splint as shown (fig. 3*a*). It is arranged that the balance records a tension of, say, 14 lb. By means of a second spring-balance a certain amount of countertraction is applied to the wooden spreader. It will be found that the spreader remains adherent to the ring until the second spring-balance registers 14 lb. traction. It is to be noted that the tension inside the apparatus remains constant (i.e., 14 lb.) as long as the spreader remains in contact with the ring. It is therefore possible to reduce the pressure on the ring of the splint by raising the foot of the bed without affecting the tension inside the apparatus (fig. 3*b*).

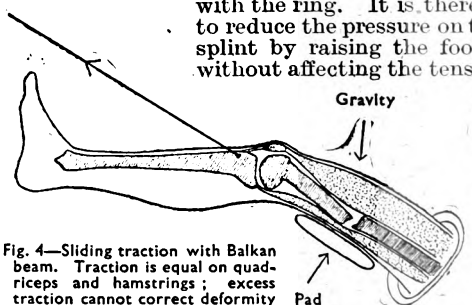

Fig. 4—Sliding traction with Balkan beam. Traction is equal on quadriceps and hamstrings; excess traction cannot correct deformity and merely results in over-distraction. Gravity acts against correction, and since the two forces are at right angles equilibrium is unstable.

Excluding shortening, there are four important deformities encountered in fractures of the femoral shaft: (*a*) posterior bowing; (*b*) flexion of the upper fragment; (*c*) lateral bowing; (*d*) rotational deformity.

Correction of Deformity

POSTERIOR BOWING

The posterior angulation of the lower fragment, which is the main component in this deformity, is commonly ascribed to the action of the gastrocnemius, as in supracondylar fractures. That this is not the sole explanation is suggested by the fact that it is a common

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residual deformity in cases treated with the flexed knee, and on the other hand that it can be corrected with great ease on the straight Thomas splint as Sir Robert Jones repeatedly taught.

It is suggested that this deformity is the result of the greater pull of the quadriceps acting against the weaker pull of the hamstrings. There is therefore a greater tendency for the thigh to shorten on the anterior aspect than on the posterior. It is obvious from this that longitudinal traction in the length of the femur alone cannot correct this deformity, for acting equally on the quadriceps as on the hamstrings it will merely produce elongation without correction of backward angulation (fig. 4). In order to correct this deformity greater traction must be applied to the quadriceps than to the hamstrings. There is no direct way of doing this, but it can be brought about indirectly in a very simple way.

Consider the analogy provided by the act of breaking a stick over the knee. If the stick were to be under a longitudinal traction force at the same time, the analogy would be complete. As the stick bends over the fulcrum of the knee, the tension in the stick increases in those fibres on the convexity, and remains unaltered in those on the concavity. It is therefore on the convexity that the crack first appears. It is so when the fractured femur is treated on a straight Thomas splint with a firm pad behind the thigh. Having first obtained full length by longitudinal traction, the direction of pull must then be brought below the line of the femur in order to angulate the fracture over the pad behind the thigh (fig. 5).

In fractures treated with the knee flexed, the femur is elevated to about 45° above the horizontal, and traction

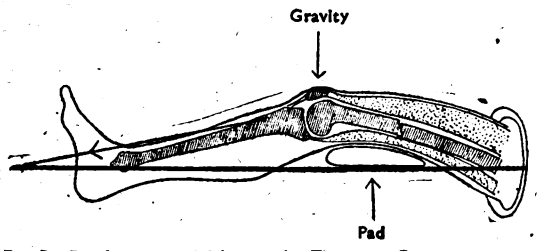

Fig. 5—Fixed traction with straight Thomas. Greater traction on quadriceps than hamstrings from bending moment over pad as fulcrum. Synergic use of gravity. Once full length is secured the position is held with minimum traction in rigid triangular system of forces. Stable equilibrium.

is roughly in the axis of the femur. The splint in these methods takes no longitudinal thrust, and when counterpoised merely acts as a floating cradle which has no absolutely fixed relation to the limb, yet carries the important pad which is used to correct the posterior bowing. The line of traction through the femur, and the upward pressure of the pad behind the thigh, are roughly at right angles to each other. In this method, no matter how powerful the traction, there can be no synergic relation between the force of the posterior pressure pad and the traction force. It can also be seen that gravity tends to increase posterior angulation. The femur is suspended, rather like a sagging bridge, between the tibial tubercle and the hip-joint. Gravity acts at some point between these two extremities. The pressure pad, attached to the floating cradle of the counterpoised splint, is thus faced with the task of counteracting the whole effect of gravity without synergic assistance from the traction force (fig. 4).

Consider now how posterior bowing is corrected by fixed traction in the straight Thomas splint. The knee is flexed to about 20° by a large firm pad behind the thigh, and the apparatus acts as a true splint and not as a cradle. The side bars transmit the force of counter-traction to the ring (fig. 5). If a canvas master-sling is used behind the thigh the posterior pad does not need readjustment when once set up, and there is no further agitation of the fracture.

In fixed traction, the line of action of the traction force is not at right angles to the thrust of the pressure pad, but is inclined towards it by an angle (equal to the amount of flexion in the knee). The more powerful the traction the greater is the synergic action of the pressure pad. Fixed traction uses gravity synergically. The force of gravity acts on the distal fragment on the distal side of the fulcrum, and thus assists the moment which the traction force exerts over the fulcrum of the pressure pad. Once full length has been secured by traction under anæsthesia and the thigh has been bent over the pressure pad and the cords tightened, the whole system becomes locked into a roughly triangulated system, and therefore a rigid system. For those who find the mechanical analysis of forces difficult to follow, the contrast between sliding and fixed traction in the conservation of effort, and in the synergic relation of the forces, is shown symbolically in fig. 6.

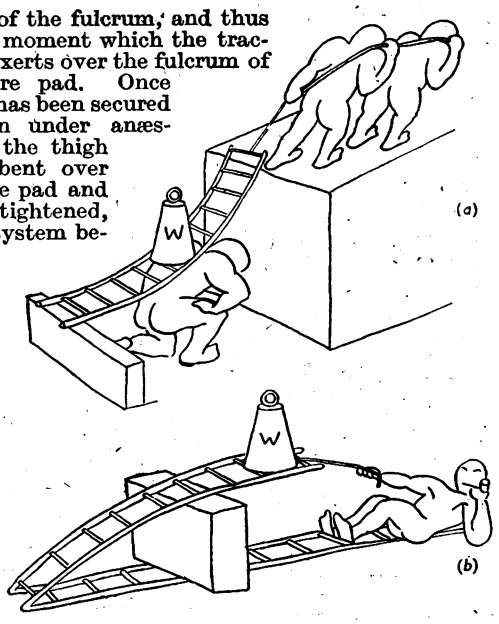

Fig. 6—(a) Sliding traction with Balkan beam: unstable equilibrium; extravagant use of traction at a mechanical disadvantage; over-distraction without correction of deformity; corrective force of gravity neglected. (b) Fixed traction with straight Thomas: stable equilibrium, triangular system of forces; conservation of traction; synergic use of gravity; length, once secured, is easily held.

FLEXION OF THE UPPER FRAGMENT

Flexion of the upper fragment is a common and troublesome deformity to correct. It is usually regarded as being caused by the contraction of the iliopsoas, and this is probably correct in very high fractures. In fractures of the upper third of the femur it is possible that this deformity is caused at the time of the original violence by the penetration of the upper fragment into the mass of the quadriceps. This explains why treatment of these cases with the hip flexed often merely results in further flexion of the upper fragment and no diminution of the deformity. On the straight Thomas splint a direct attempt to correct the flexion is often successful if the following precedure is adopted :—

The slings supporting the posterior aspect of the thigh from the ring down to the level of the fracture are removed, and are replaced so that they pass from side bar to side bar in front of the thigh. On tightening these slings the upper fragment is forced back. Any tendency to œdema of the unsupported tissues at the site from which the slings have

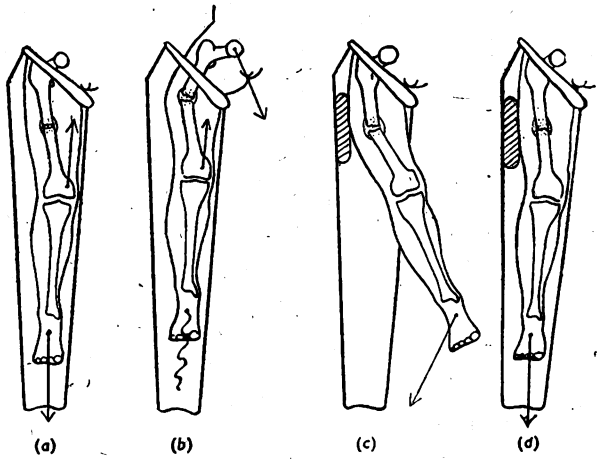

Fig. 7—Mechanism and correction of labe varus deformity. (a) and (b) Penalty of allowing tuber ischii to fall away from ring when reducing traction. (c) and (d) Method of correcting deformity. Note: restoration of traction alone will not correct it.

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been removed, is prevented by a circular flannel bandage passed round splint and limb.

LATERAL BOWING

This is produced by the action of the adductors and is fully corrected by the action of the traction force (fig. 7). With the knee almost straight the existence of this deformity is readily noticed, but in the methods used with the flexed knee it is often first noticed in an X ray and often when the fracture is very "sticky."

As a late deformity it results from the too early reduction of weight traction in those methods which depend on traction to maintain alignment and which do not provide any local fixation for the fracture (fig. 7*a* and *b*). Gradual correction in the malleable stage by local pressure applied over the summit of the convexity on the outer aspect of the thigh, may be insufficient and may merely result in the loss of valuable time. When treated on the straight Thomas splint a gradual correction involving great leverage can be obtained as follows :—

The traction is released and the limb adducted till the foot lies medial to the inner side bar, thus bringing the upper fragment into correct alignment with the long axis of the splint, from its original abducted position (fig. 7*c*). A rigid pressure pad is then applied to the outer aspect of the thigh, the most convenient type being one which can be clamped to the side bar and exert its pressure against a padded plaster slab moulded to the limb (fig. 10*a*). The limb is then replaced in the splint and on reapplying traction a slow moulding of the callus results (fig. 7*d*). This procedure can be repeated several times if necessary.

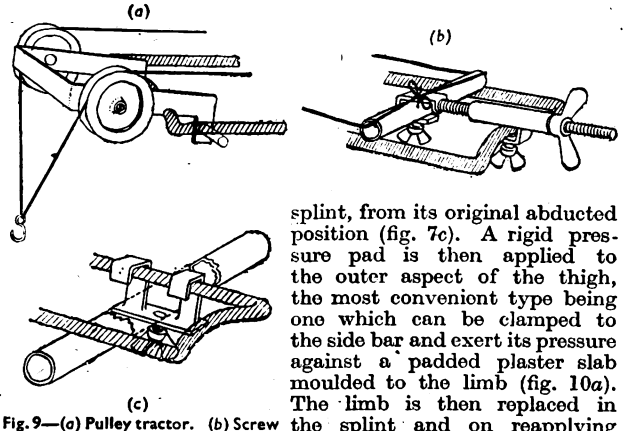

Fig. 9—(*a*) Pulley tractor. (*b*) Screw tractor. (*c*) Bed-rail clamp.

ROTATIONAL DEFORMITY

There is always a tendency for the upper fragment to roll into the cadaveric position. In the knee flexion methods it is sometimes difficult to find a natural lie for the distal limb other than with the toes directed vertically to the ceiling. On the straight Thomas splint any degree of external rotation of the distal limb can be easily arranged.

Immobilisation

The axiom that to immobilise a fracture necessitates the fixation of the joints above and below the fracture can never be completely followed in the case of the femur. When the Thomas splint is counterpoised in suspension from a Balkan beam, the ring of the splint bears an indeterminate relation to the root of the limb. It is difficult to see how even imperfect fixation can be expected unless the ring of splint is firmly applied to the groin. Even here however the fixation is better than that afforded by the Braun frame.

It is sometimes argued that with fixed traction, movements such as rising to use a bedpan must disturb the relation of the upper fragment to the ring. In practice when such movements are performed the patient merely grasps the anterior portion of the ring with his disengaged hand, and lifts splint and leg together so that the relation is not disturbed.

When the straight Thomas splint is used in conjunction with fixed skeletal traction through the tibial tubercle there is only one source of mobility, and this is peculiar to the method. There is a tendency for the limb below the fracture to be unstable to rotation in its long axis. This is only encountered when the fracture itself is very mobile, but it is easily prevented by anchoring one end of the Steinmann nail to the side bar of the splint by means of a simple clamp (fig. 10*b*).

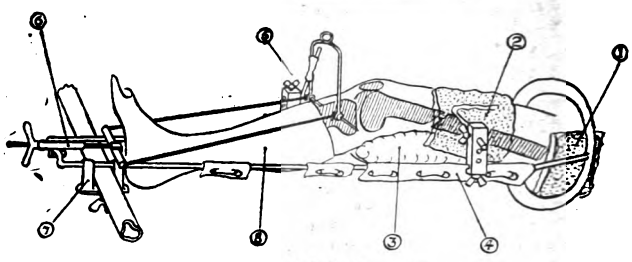

Fig. 8—Fixed skeletal traction.

1. Plaster slab.
2. Pressure pad.
3. Posterior pad.
4. Master sling.
5. Stirrup steady.
6. Screw tractor.
7. Bed rail clamp.
8. Below-knee cast.

FIXED TRACTION ON THOMAS SPLINT

Apparatus and technique.—The Thomas bed knee-splint (fig. 8) should have a flat oval ring, and the variety with a depression near the inner side bar attachment should be avoided. The space on the outer side of the thigh when the tuber ischium is settled on the ring should always be filled with a block of felt and plaster-of-paris or a very firm pad. The thigh is supported posteriorly with a permanent calico "master sling," extending as far down as the middle of the popliteal space, and bearing a pad thick enough to ensure about 20° flexion in the knee. Paper clips should be avoided for this sling. Fig. 10*b* shows the method of attachment of the double traction tapes to the ends of the Steinmann stirrup. Linen tape is preferred to blind cord for fixed traction, because when new it has much less stretch.

The ankle is supported at right angles, and the pressure surfaces of the heel and tendo achillis are protected by the routine use of a below-knee plaster cast applied over felt at the heel and malleoli. This is by far the safest and most comfortable way of dealing with that part of the limb which is the only source of pain or discomfort during the treatment of a fractured femur. It should never be omitted if the fracture is infected and the patient has any tendency to œdema at the ankle. It can be discarded as soon as union is sufficiently advanced to allow of the patient actively moving his heel (6—8 weeks) and the danger of pressure-sores is past. There is no possibility of the ankle becoming stiff. This routine use of plaster for maintaining the foot position and protecting the heel has been found of paramount importance when over 30 femurs have been under treatment at one time in the same ward with a minimum of trained staff.

Under full muscular relaxation the fracture is now distracted manually, and the tapes fixed rigidly to the foot of the splint. If full length is attained in oblique or comminuted fracture no more need be done. In transverse fractures it is essential to have an immediate X-ray examination, and if the wet films reveal that over-riding is still present the case must be treated on heavy weight traction. Using the pulley tractor described below with 25–30 lb., reduction is usually secured in four days. Weight traction is changed to fixed traction in the ward after 14 days.

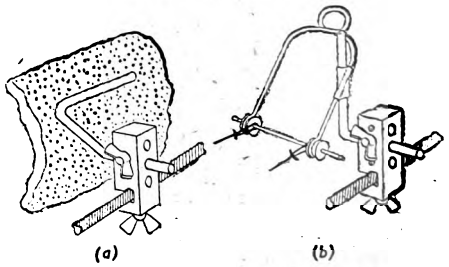

Fig. 10—(*a*) Pressure pad. (*b*) Stirrup steady.

In addition to the standard hospital equipment the following four small appliances have been found extremely useful :—

Pulley tractor.—This device carries two pulleys which can be clipped on the foot of the Thomas splint, and enables an initial fortnight on weight traction to be exerted with the same mechanical arrangement of forces as has been shown to be advantageous in fixed traction (fig. 9*a*).

Screw tractor.—This is the means by which fixed traction is applied to the tibial pin (fig. 9*b*) ; and in those cases which need

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an initial period on weight traction the conversion to fixed traction can be effected without any disturbance of the limb. It must be stressed that the screw tractor is not used to produce forcible mechanical distraction of the limb; but it is a convenient means of producing accurate alterations (which have been estimated from radiography or by direct measurement) in the length of the limb; it is difficult to produce such accurate alterations by the tying or untying of knots.

Bed-rail clamp.—This is a convenient means of attaching the Thomas splint to the foot of the bed, and is made for the standard 1¼ in. bed rail (fig. 9c). It is necessary in the system outlined here, as elevation of the foot of the bed is a routine during the first two to four weeks.

Side-bar clamp.—This is a simple universal screw clamp which can be attached to the side bars of the Thomas splint. It can be used as a pressure pad to apply lateral pressure to the limb with the aid of a moulded plaster slab between clamp and limb. It can also be used as a "stirrup steady" (fig. 10) to prevent rotation of the limb distal to the fracture (fig. 10*a*).

Conduct of case in the ward.—The foot of the bed is raised on 6 in. blocks as a routine during the first fortnight, and thereafter reduced in stages. This measure removes the necessity for the intense vigilance over the care of the skin of the perineum which is necessary when using fixed traction in the ordinary way, but that portion of skin which is under the ring should be changed at least as often as the back of the patient is attended to. The simplicity of nursing the pressure point under the ring is also due to the fact that in this system no case requiring very powerful traction is treated on fixed traction from the outset. Weight traction during the first fortnight is the most comfortable form of traction, since the patient is able to ease himself away from the ring in a way quite impossible under the unrelenting pull of heavy fixed traction.

A useful sequence in which to inspect such a case on fixed traction is as follows:—

1. Palpate the tuber ischium for position on ring.
2. Make sure that there is no backrest or pillow under the shoulders in the early stages when the foot of the bed is raised.
3. Measure the length.
4. Inspect general alignment from foot of bed.

If the length is equal, and the tuber has fallen away from the ring, this means that the tapes have stretched. This is corrected by shortening the screw tractor. If the limb is over length, and the tuber has fallen away from the ring, the blocks are too high. If the tuber is pulling through the ring, and the length too short the blocks must be raised, but more properly such a case should have an initial fourteen days on weight traction with the pulley tractor. If the tuber is pulling through the ring, and length correct, the screw tractor must be released.

Summary

The popular methods for the treatment of the fractured femur have been analysed from a mechanical standpoint.

An attempt has been made to assemble, from existing methods, a system of treatment which satisfies certain mechanical principles.

In this system, weight traction and fixed traction are immediately interchangeable without any interference in the direction of the lines of force or disturbance of the fracture.

The only absolute indication for weight traction is considered to be the closed transverse fracture with gross swelling of the thigh. All other cases are best treated on simple fixed traction.

Several small appliances are described here which have been found helpful in using this system.

I wish to record my debt to the late Brigadier W. J. Eastwood, consultant orthopædic surgeon MEF, thanks to whom I first realised fully the importance of fixed traction as a principle; and to Major E. A. Jack, RAMC, who generously shared his impressions of the method, thus making a common pool of experience of the 130 cases of femoral fractures which passed through the orthopædic centre from November, 1941, to May, 1943.

ACCURACY OF HÆMOGLOBIN METHODS

E. J. KING
M A MCMASTER, PH D TORONTO
READER IN PATHOLOGICAL CHEMISTRY, UNIV. LONDON

MARGARET GILCHRIST
M SC MANITOBA
RESEARCH ASST., BRITISH POSTGRADUATE MEDICAL SCHOOL

G. E. DELORY, M SC LOND
BIOCHEMIST, PRESTON ROYAL INFIRMARY; FORMERLY ASSISTANT IN PATHOLOGICAL CHEMISTRY AT THE POSTGRADUATE SCHOOL

FROM a study of the published work on hæmoglobin methods, Clegg and King (1942) concluded that of the simpler colorimetric procedures in current use the alkaline hæmatin method of Wu (1922) was probably the one most likely to give reasonably accurate results for total hæmoglobin. Evidence was adduced to show that the brown colour produced on adding blood to dilute sodium hydroxide solution was directly proportional to the amount of hæmoglobin present; that methæmoglobin, carboxyhæmoglobin and sulphæmoglobin gave the same proportion of colour as the corresponding amounts of oxyhæmoglobin; and that plasma proteins, lipoids and bile pigment had little, if any, effect on the intensity of the colour. The method has been in routine use for two years, and, with a photoelectric photometer to measure the intensity of colour, has given satisfactory results quickly and easily and with a minimum of labour.

The accuracy of the method was not, however, finally settled by the results presented in the former communication, and as we have wished to ascertain the most accurate colorimetric procedure as well as the one most useful for routine, a study has been made of the results obtained with selected colorimetric procedures in comparison with iron analyses and oxygen capacity determinations.

In addition to the alkaline hæmatin method, the carboxyhæmoglobin procedure has been tested in both Haldane (1900) and Palmer (1918) modifications (in the latter the colour is assessed in a Duboscq colorimeter or photometer). The cyanmethæmoglobin method, extensively studied by Drabkin and Austin (1935a and b, Austin and Drabkin 1935) and adopted by Evelyn and Malloy (1938) for photoelectric use, appeared to be the most precise procedure thus far described, and although perhaps not suitable for routine work because of the use of cyanide seemed admirably suited for research purposes. Several hæmochromogen methods (globin, pyridine, quinoline, picoline and histidine) were given a preliminary investigation, but were discarded because of a fault which appeared to be general—that the rate of colour development is not identical in the test prepared from blood and the standard from hæmin. Previous results (Clegg and King 1942) had confirmed the widespread opinion that the acid hæmatin procedure (Sahli 1889, Cohen and Smith 1919) is not sufficiently accurate to furnish a method of precision. The comparison was, therefore, narrowed to the cyanmethæmoglobin, the alkaline hæmatin and the carboxyhæmoglobin procedures.

Methods of Investigation

Whole blood.—Blood was drawn from an arm vein and clotting prevented by the addition of the minimum of heparin. Specimens were gently mixed by inversion before removing samples by pipette.

Cell solutions.—Red blood corpuscles were washed three times on the centrifuge with 3% $Na_2SO_4.10H_2O$ and laked with slightly more than their volume of N/20 NH_3 solution —i.e., 0·3 ml. of conc. ammonia, sp. gr. 0·88, per 100 ml. The hæmolysed solutions were centrifuged and filtered through glass wool to remove any debris.

Pipettes.—A 1 ml. pipette, calibrated "to contain," was used for all samples of whole blood, and a 1 ml. pipette calibrated "to deliver" for all samples of cell solutions. (The same 1 ml. pipettes were used for O_2-capacities and for the colorimetric methods.) Samples of whole blood for iron analyses were measured with a 5 ml. pipette calibrated "to contain" and washed out. For cell solutions, samples were measured by delivery from a 10 ml. pipette.

Iron analyses.—The samples of blood were dried and ashed in 100 ml. 'Pyrex' beakers; dissolved in HCl and the ferric iron titrated with $TiCl_3$ made up in freshly distilled water which had been allowed to cool under CO_2 (cf. Delory 1943).

Oxygen capacities.—The Warburg-Barcroft gasometric apparatus described by Dixon (1934) was used. The pro-

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cedure was checked against Van Slyke's O_2 method with the manometric apparatus. Results can be obtained with the Warburg-Barcroft method which are comparable with Van Slyke values (cf. Gibson 1943) and the procedure is somewhat easier; but as a result of our comparisons of both methods we have come to the conclusion that the Van Slyke is the only procedure which will furnish results which can be accepted with complete confidence.

Alkaline hæmatin.—1 ml. of blood was washed from a pipette calibrated "to contain" into N/10 NaOH, in a 100 ml. flask and made up to volume with N/10 NaOH. The same flask was used for all determinations. A test-tube full of this solution was heated for 4 min. in a boiling water bath, cooled and read in a colorimeter.

Cyanmethæmoglobin.—1 ml. of blood was delivered into a 100 ml. flask containing 50 ml. N/20 NH_3 and the pipette (to contain) rinsed with N/20 NH_3 into the flask; 1 ml. of 2% $K_3Fe(CN)_6$ was added, and the mixture allowed to stand for 15 min. Then 0·4 ml. of 10% NaCN was added, and the solution made up to volume with N/20 NH_3, mixed and read.

Carboxyhæmoglobin.—1 ml. of blood was measured as above into a 100 ml. flask containing N/20 NH_3 solution, made to volume, mixed, transferred to a 250 ml. conical flask, and gassed for 10 min. with pure CO from a cylinder. Haldane's estimations on 0·02 ml. of blood were carried out in the usual way.

Measurement of colour.—Two instruments were used, a Leitz colorimeter (Duboscq type) illumined by mercury green light, and a photoelectric colorimeter (King 1942), equipped with optical cells (1 cm. square by 10 cm. long) made by the Lovibond Tintometer Co. and a Chance green light filter. These instruments give equally accurate and reproducible results, but the amount of labour entailed is much greater with the visual colorimeter, since it is necessary to make several comparisons on each coloured solution and to average the readings. The photoelectric readings, on the other hand, agree to less than ½% and it is only necessary to take one reading on each solution.

Standards of colorimetric reference.—The most convenient standards are Ilford grey screens. These serve as photometric standards for any coloured solution read with a suitable light filter (cf. King et al. 1937). They are inexpensive, easily obtainable and are apparently permanent if kept away from heat and from light when not in use. By comparing a grey screen against a few bloods of known hæmoglobin content (by O_2 or iron analyses) with an Ilford spectrum green light filter over the eye-piece of a Duboscq colorimeter, or a Chance green filter in a photoelectric instrument, it is possible to assign a hæmoglobin value to the grey screen, which may thereafter be used as a standard. Grey screens are mounted in optical glass and are procurable in any size and shape to fit any instrument. The 0·5 density screens are suitable for both Duboscq and photoelectric instruments with the three colorimetric methods tested.

The hæmin standard recommended by Clegg and King was used interchangeably with a neutral grey screen for the comparisons in the alkaline hæmatin method. It is convenient to standardise a grey screen in combination with an Ilford spectrum green filter in a Duboscq or with a Chance green filter in a photoelectric colorimeter, by reference to a hæmin standard solution. The hæmin used by us for all standard solutions is British Drug Houses' crystalline hæmin 8·41% Fe. This hæmin is 98% pure. When it is dissolved in N/10 NaOH, it is advisable that the resulting solution be filtered through glass wool in order to remove the minute amount of insoluble impurity present. (The solution should not be filtered through filter paper, which absorbs some of the hæmin.) Although the standard solutions appear to keep for many months when left in the volumetric flasks in which they are prepared, they are definitely not permanent, and, as in all colorimetric analytical procedures, new standards should be prepared at regular intervals—e.g., of two or three months. Standards are not stable in reagent and medicine bottles, in which the NaOH attacks the glass forming the flaky precipitate commonly seen in bottles of soda solution. It is recommended that a quantity of the standard be poured from the volumetric flask into a test-tube for use, and that it be thrown away at the end of the day. In no case should it be poured back into the flask. 81 mg. of BDH hæmin (8·41% Fe) dissolved in 1 litre of N/10 NaOH gives the same intensity of colour as blood of 15·6 g. hæmoglobin per 100 ml. when diluted 1 in 100 in soda, and compared with a green light filter.

Relation of colour to iron and O_2.—The optical densities (assessed in visual or photoelectric colorimeters) of the coloured test solutions prepared from any blood were factored by the Fe or O_2 results to give the extinction coefficients relative to Fe or O_2. The average extinction coefficients for a series of bloods or cell solutions by any one of the colorimetric hæmoglobin methods was then used to derive the colorimetric equivalent of Fe, O_2 or hæmoglobin for each individual specimen. The hæmoglobin content of a blood determined by any colorimetric method was thus derived from the average Fe or O_2 equivalent for the whole series. By comparing the individual results so obtained with their corresponding Fe or O_2 analyses, a measure is secured of the extent of deviation of any blood from the average colorimetric behaviour. The Fe or O_2 figures are, therefore, the base-line with which the colorimetric results are compared and by which their accuracy is gauged. The smaller the deviation, the greater is the accuracy.

RESULTS

Hæmoglobin preparations.—Twelve samples of hæmoglobin were prepared by the aluminium hydroxide alcohol procedure of Marshal and Welker (1920) as described by Delory (1943). No difficulty was experienced in obtaining crystalline hæmoglobin from horse blood by this procedure. But in no case were we successful with human blood; our preparations were all amorphous and were not as pure (by iron analysis) as the horse hæmoglobins. All specimens were vacuum dried (over sulphuric acid), and were analysed immediately before use. Samples were weighed, dissolved in N/10 NaOH, and the colour of the resulting solutions compared with standards of alkaline hæmatin in a photoelectric colorimeter. Table I shows that the results obtained by reference to hæmin are in good agreement with the figures derived from the known iron content.

TABLE I—COLORIMETRIC ANALYSIS OF HÆMOGLOBIN PREPARATIONS *

(Approximately 160 mg. Hb dissolved in 100 ml. N/10 NaOH, and the colour compared with a standard solution of crystalline hæmin)

Hæmoglobin preparation			Mg. Hb per 100 ml.	
Species	Nature of product	% Fe	Present†	Found‡
Human	Amorphous	0·265	129	130
,,	,,	0·263	127	130
,,	,,	0·289	146	147
,,	,,	0·263	129	130
,,	,,	0·254	126	130
Horse	,,	0·305	147	144
,,	Crystalline	0·308	150	145
,,	,,	0·301	149	150
,,	,,	0·322	158	156
,,	,,	0·314	158	160
,,	,,	0·320	160	160
,,	Partly crystalline	0·303	150	144

Coefficient of variation (from Fe results) = 2·18 %

* Hæmoglobin prepared and analysed for Fe ($TiCl_3$ method) as described by Delory (1943).

† Pure hæmoglobin assumed to contain 0·334 % Fe.

‡ By comparison with hæmin (hæmin Fe equivalent of hæmoglobin Fe = 1·3, cf. Clegg and King 1942).

Normal bloods.—Twenty normal volunteers—laboratory workers, physicians and Army officers—were bled from an arm vein. The 25 ml. of blood was treated with heparin and 5 ml. samples were used for iron analyses and 1 ml. samples for each colorimetric method. All determinations were in duplicate. The average figures are given in table II. All three colorimetric procedures have given satisfactory agreement with the actual hæmoglobin contents of the different bloods, but the cyanmethæmoglobin method appears to be the most accurate. The CO-hæmoglobin method, when the colour is assessed in a proper colorimeter, is a little more accurate than the alkaline hæmatin method, in these normal bloods; but with the cruder comparison in the Hawksley Haldane comparator the agreement is less good. Comparisons between the colorimetric method and O_2-capacities were made on the twenty-four normal bloods whose results appear in table III.

Hospital bloods.—Twenty specimens of blood were secured from the routine laboratory. All were from patients in Hammersmith Hospital. For the most part they were analysed on the day after taking. No attempt

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TABLE II—COMPARISON OF HÆMOGLOBIN METHODS WITH IRON ANALYSES ON NORMAL WHOLE BLOOD
(Results as g. Hb per 100 ml. blood)

No.	Iron (by $TiCl_3$)*	Colorimetric hæmoglobin methods: Alk. hæmatin†	Cyanmet-Hb†	Carboxy-Hb†	Haldane‡
1	16·2	16·0	16·3	16·2	15·3
2	16·5	16·2	16·2	16·3	15·5
3	15·2	15·4	15·5	15·6	16·1
4	18·2	18·8	18·4	18·1	18·8
5	17·0	17·7	17·2	17·2	17·6
6	16·8	17·4	16·8	16·8	16·9
7	18·0	18·3	18·1	17·7	18·6
8	14·1	14·0	14·1	14·4	14·0
9	16·1	16·0	15·9	15·9	15·7
10	14·6	14·4	14·6	14·8	14·2
11	14·3	14·4	14·5	14·7	14·2
12	15·1	15·3	15·3	15·4	15·4
13	15·5	15·6	15·7	15·6	15·9
14	16·8	16·9	16·8	16·4	16·6
15	16·7	16·5	16·8	16·6	16·8
16	15·9	15·3	15·6	15·7	15·7
17	16·7	16·5	16·5	16·3	16·3
18	15·8	15·3	15·4	15·4	15·9
19	16·3	16·0	16·3	16·1	16·5
20	14·8	14·2	14·7	14·8	14·8
V % (from Fe)		2·33	1·25	1·70	3·02
V % (from alk. hæm.)		..	..	..	2·75

* Hæmoglobin assumed to contain 0·334% Fe.
† Read in photoelectric colorimeter.
‡ Read in Haldane dilution tubes in Hawksley comparator.

TABLE III—COMPARISON OF HÆMOGLOBIN METHODS WITH OXYGEN CAPACITIES ON NORMAL BLOODS
(Results as ml. O_2 per 100 ml. blood)

II: V = Coefficient of variation

III: (A) *By Warburg*

No.	Oxygen capacity	Colorimetric hæmoglobin methods: Alk. hæmatin	Cyanmet-Hb	Carboxy-Hb
1	21·6	20·9	21·1	21·1
2	24·6	24·5	24·0	23·4
3	22·6	23·0	22·4	22·3
4	22·5	22·7	21·9	21·8
5	23·3	23·8	23·5	23·0
6	18·4	18·2	18·3	18·7
7	20·5	20·7	20·6	20·6
8	19·1	18·7	19·0	19·2
9	19·1	18·7	18·8	19·1
10	19·5	19·9	19·9	20·0
11	19·8	20·3	20·4	20·3
12	22·1	22·0	21·8	21·3
13	20·8	21·4	21·9	21·5
14	20·0	19·9	20·3	20·4
15	21·2	21·4	21·4	21·2
16	20·2	19·9	20·1	20·0
17	21·7	20·9	21·1	20·8
18	18·3	18·5	19·1	19·2
(B) *By Van Slyke*				
19	22·5	23·3	22·6	22·8
20	21·8	21·9	22·2	22·0
21	21·2	22·1	21·2	21·5
22	20·4	20·1	20·2	20·5
23	21·8	20·9	21·9	21·8
24	23·2	22·8	22·6	22·2
V % (from O_2)		2·26	2·18	2·49

was made to keep the specimen in a fresh condition; the oxalated sample was left on the bench over night and used the next day. In order to facilitate analyses, the plasma was discarded, the cells laked with water and the hæmolysed solution centrifuged. Duplicate 10 ml. portions were used for iron analyses, 2 ml. for O_2 and 1 ml. for the colorimetric procedures. The results are contained in tables IV and V.

On these hospital bloods the cyanmethæmoglobin procedure is again the most accurate; the alkaline hæmatin appears second-best; and the carboxyhæmoglobin third—this in spite of precise colorimetry. That the CO-hæmoglobin method should not fare as well as the others with abnormal bloods is understandable in view of the fact that abnormal hæmoglobins are not affected by carbon monoxide—e.g., methæmoglobin is not turned into CO-hæmoglobin by carbon monoxide, whereas in the cyanmethæmoglobin or alkaline hæmatin procedures it reacts like oxy- or reduced hæmoglobin.

Routine Methods of Estimation

Alkaline hæmatin.—0·05 ml. blood is mixed with 4·95 ml. N/10 NaOH, heated in boiling water for 4 min., cooled and read against a hæmin standard or a grey screen with a green light filter.

Cyanmethæmoglobin.—0·05 ml. blood is collected in 9·85 ml. N/20 NH_3; 0·05 ml. of 4% $K_3Fe(CN)_6$ is added, and, after 15 min., 0·05 ml. of 8% NaCN solution. (The 0·05 ml. of $K_3Fe(CN)_6$ and NaCN are most conveniently and safely added from rubber-teated droppers, which are selected to give the correct quantity by counting the drops required to fill a 5 ml. cylinder.) The solution is mixed and the red colour measured in a visual or photoelectric colorimeter using a green light filter and a grey screen.

Carboxyhæmoglobin.—0·05 ml. blood is mixed with 9·95 ml. N/20 NH_3, well gassed with CO, and read against a grey screen with a green light filter.

The volumes 4·95, 9·85 and 9·95 ml. are best measured by means of specially calibrated pipettes. These are easily prepared by selecting good 5 and 10 ml. delivery pipettes and allowing 0·05 ml. or 0·15 ml. to run from the tip through a short, fine rubber connexion into a capillary pipette of appropriate size. The position of the meniscus is then noted, slightly below the original mark on the 5 or 10 ml. pipette, and a new mark is made with a file or diamond.

Ilford neutral grey screen as standard.—The 0·5 density grey screens are of a suitable optical density for easy matching when used in a Duboscq colorimeter with a spectrum green filter (both obtainable from Messrs. Ilford Ltd.). The optical density of any screen supplied may not be quite that which was ordered, but the density is always stated exactly. The one we have used in the present measurements is 0·57 D_t.

With Duboscq colorimeters the screen (1 in. diameter) is placed on the left-hand rack in place of the standard cup, and the green light filter (½ in. diameter) over the eye-piece. The coloured solution is placed in the cup on the right-hand side, and its depth is adjusted until a match is secured. Several readings are made and the average depth in mm. recorded.

In table VI are given the readings for test solutions prepared from six normal bloods according to the three colorimetric methods, and read against the grey screen on three different colorimeters of the makes most commonly in use. The same grey screen was used, but different spectrum green light filters. The same readings were obtained with all three instruments for any blood treated by any one method. The readings have all been calculated to a common basis—i.e., the depth in mm. at which the bloods, whose O_2-capacities had been accurately determined by Van Slyke, would match the grey screen when diluted to a hæmoglobin content of 15·6 g. corresponding to 20·9 ml. O_2.

To calculate the Hb content of any blood measured by one of the procedures described the reading in mm. of the test solution against a 0·5 D screen is introduced in the equations as follows:—

(1) Alkaline hæmatin—

$$\frac{15{\cdot}6 \times 8{\cdot}75}{\text{reading of test}} = \text{g. Hb/100 ml. blood}$$

or

$$\frac{100 \times 8{\cdot}75}{\text{reading of test}} = \text{Hb as \% of Haden normal.}$$

(2) Cyanmethæmoglobin—

$$\frac{15{\cdot}6 \times 12{\cdot}8}{\text{reading of test}} = \text{g. Hb/100 ml. blood}$$

or

$$\frac{100 \times 12{\cdot}8}{\text{reading of test}} = \text{Hb as \% of Haden normal.}$$

(3) Carboxyhæmoglobin, similarly, using 12·95 mm. as standard reading.

With grey screens of other densities the standard equivalents in mm. are derived by simple calculation as illustrated in table VI. For bloods of very low Hb content it is advisable to use a weaker grey screen—e.g., of 0·25 density, whose Hb equivalent would be half that of the 0·5 density screen.

With photoelectric colorimeters the neutral grey screen is also a satisfactory standard. It is necessary to calibrate a grey screen in a given instrument against several bloods whose Hb contents have been accurately determined. Once this calibration has been made the grey screen serves as a convenient and apparently permanent standard. Liquid standards can, of course, be used for routine comparisons.*

Discussion

Hawk and Bergeim (1938), in their text-book of physiological chemistry, remark that, despite a great amount of work spread over many years, the determination of hæmoglobin remains one of the most unsatisfactory of all analytical procedures. This is the more surprising in view of the enormous numbers of hæmoglobin estimations which are daily carried out—more, certainly, than of any other single constituent of the blood—and the importance attached to them in clinical medicine and research.

* The alkaline hæmin standard (Clegg and King 1942), the Palmer (1918) CO-Hb standard and the cyanmet-Hb standard of Wu described by Peters and Van Slyke (1932), are fairly permanent and may be used satisfactorily in any colorimeter or for standardising grey screens. We shall be glad to send samples of liquid standard to anyone wishing to make this standardisation.

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The most potent cause of this uncertainty about the reliability of hæmoglobin methods lies in the curious survival of the old dilution type of colorimetric comparator. This type of instrument has long since disappeared from all other colorimetric analyses in medical and general biochemistry. Duboscq colorimeters have taken its place for a great many years. Their ease and speed of manipulation, as well as their high precision of colorimetric matching, has led to their almost universal adoption. Only within very recent years has their supremacy in the colorimetric field been challenged—by the visual and photoelectric photometer. And yet very little hæmoglobinometry has been done with these instruments. The Newcomber (1923) Duboscq procedure has had a considerable vogue in America and lately photoelectric methods have been widely adopted there. But it remains true that, in this country at least, the vast majority of hæmoglobin estimations are carried out in the simple dilution tubes, compared by direct matching with a standard, of either the Haldane or Sahli procedures. If the Haldane "titration" method of colorimetric matching is followed—i.e., a continual shifting of the test from one side to the other of the standard while the dilution is being made—a fair degree of accuracy can be attained. But most operators are misled by the reproducibility of matching into thinking that they are assessing the colour with a high degree of accuracy. A comparison with the result of someone else's matching of the same blood would convince them of the uncertainty of this crude type of colorimetry. And with crude colorimetry, accurate hæmoglobinometry, or precise assessment of the accuracy of hæmoglobin methods, is not possible.

In this investigation we have used methods of assessing colour which we believe to be generally recognised by analysts as the most accurate—Duboscq, photoelectric and photometric. We have satisfied ourselves that an equal degree of accuracy is attainable by all three types of measurement, and we are convinced that the colour assessment is not only much more precise but also very much easier and quicker—particularly with a photoelectric colorimeter—than with dilution tubes. Within the bounds of accuracy imposed by the best colorimetric instruments, then, our results should truly reflect the reliability of the different hæmoglobin methods.

There can be no doubt that the cyanmethæmoglobin procedure is one of the best methods of which we have had experience—not only among hæmoglobin methods but among colorimetric procedures in general. It is obviously the method of choice for research purposes. Whether it can serve as a routine tool is a matter for the individual laboratory to decide. It is simple and easy, as well as accurate, but the hazard of using cyanide routinely is undoubtedly real. We feel that for routine use in a hospital laboratory the alkaline hæmatin method is the most satisfactory; it is quicker and easier than the cyanmethæmoglobin (or the CO-hæmoglobin) and no toxic reagent is used. The carboxyhæmoglobin procedure yields excellent results on normal blood, and, although not as accurate as cyanmethæmoglobin, is certainly accurate enough for most purposes. It may be less accurate with pathological bloods where abnormal hæmoglobin may be present.

Some of the CO-hæmoglobin figures shown in the tables are higher than the corresponding Fe or O_2 results. These CO-hæmoglobin solutions appeared perfectly clear, but it is possible that there was an imperceptible turbidity which increased their apparent colour, giving falsely high results. Visible clouding is not infrequently met with in routine hæmoglobinometry with the Haldane method. This turbidity cannot be overcome by *any* colorimetric method. It cannot be compensated for—it must be got rid of, if accurate results are desired. The alkaline hæmatin method possesses the advantage that the strong alkali used has a solvent action on the precipitated lipoid and protein material which is responsible for the occasional clouding encountered in carbon-monoxide methods.

TABLE IV—COMPARISON OF HÆMOGLOBIN METHODS WITH IRON ANALYSES

(Results as g. Hb per 100 ml. blood*)

TABLE V—COMPARISON OF HÆMOGLOBIN METHODS WITH OXYGEN CAPACITIES

(Results as ml. O_2 per 100 ml. blood)

	IV				V			
No.	Iron (by $TiCl_3$)†	Colorimetric hæmoglobin methods‡			No.	Oxygen capacity§	Colorimetric hæmoglobin methods		
		Alk. hæmatin	Cyanmet-Hb	Carboxy-Hb			Alk. hæmatin	Cyanmet-Hb	Carboxy-Hb
1	14·1	14·2	..	13·7	1	18·6	18·7	..	18·4
2	7·5	7·7	..	7·8	2	10·1	10·2	..	10·5
3	10·9	10·9	11·0	10·5	3	14·5	14·4	15·0	14·2
4	8·6	8·7	8·6	8·9	4	11·2	11·4	11·3	11·5
5	13·6	14·0	13·9	14·9	5	17·5	18·3	18·1	19·6
6	9·5	9·3	9·2	9·3	6	12·3	12·2	12·0	12·2
7	14·0	14·7	14·5	15·1	7	18·1	19·0	18·9	19·9
8	13·5	13·7	13·6	13·5	8	15·8	16·3	15·4	16·1
9	11·9	12·3	11·7	12·2	9	15·7	15·3	15·8	15·8
10	12·1	11·5	12·1	12·0	10	17·2	16·6	17·1	16·7
11	13·0	12·9	13·1	12·7	11	18·1	18·2	18·2	18·3
12	13·9	13·9	13·9	13·9	12	15·2	15·2	15·0	14·8
13	11·4	11·4	11·5	11·2	13	14·5	14·0	14·3	14·2
14	11·9	10·8	11·0	10·8	14	14·6	14·5	14·7	14·8
15	11·4	11·1	11·3	11·2	15	15·5	15·1	15·3	15·2
16	11·6	11·7	11·7	11·6	16	12·7	12·7	12·7	12·6
17	9·5	9·7	9·7	9·6	17	16·4	16·3	16·4	16·4
18	12·3	12·4	12·6	12·5	18	16·7	16·2	16·3	15·9
19	12·1	12·3	12·5	12·1	19	13·6	13·9	13·8	13·5
20	10·3	10·7	10·5	10·3					
V % (from Fe results)		3·30	2·63	4·14	V % (from O_2 capacity)		2·56	2·11	3·32

* 50 ml. blood centrifuged; cells washed and laked with N/20 NH_3.
† Hæmoglobin assumed to contain 0·334% Fe.
‡ Visual photometric measurement, mercury green light.
§ 50 ml. blood centrifuged; cells thrice washed and laked with N/200 NH_3.

TABLE VI—ILFORD NEUTRAL GREY SCREEN EQUIVALENTS OF COLORIMETRIC HÆMOGLOBIN METHODS

(Duboscq colorimeters, 0·57 density grey screen and Ilford spectrum green filter)

Figures represent the mm. of coloured test solution which matched the grey screen (averages for 6 normal bloods), calculated to 15·6 g. Hb/100 ml. when treated according to the colorimetric procedures described.

Equivalents	Colorimetric hæmoglobin methods								
	Alk. hæmatin			Cyanmet-Hb			Carboxy-Hb		
	1	2	3	1	2	3	1	2	3
Av. for each colorimeter (mm.) ..	10·05	10·00	9·88	14·57	14·53	14·70	14·73	14·77	14·78
Av. for all colorimeters (mm.) ..	..	9·98	..	..	14·60	..	..	14·76	..
Coefficient of variation (%) ..	..	3·05	..	..	1·95	..	..	2·48	..
Equiv. of 0·50 density grey screen (mm.)*	$9·98 \times \frac{0·50}{0·57} = 8·75$			$14·60 \times \frac{0·50}{0·57} = 12·8$			$14·76 \times \frac{0·50}{0·57} = 12·95$		

1. Bausch and Lomb colorimeter, macro cups and plungers.
2. Bausch and Lomb biological type colorimeter, micro cups and plungers.
3. Klett colorimeter, macro cups and plungers.

* A 0·50 density screen would match a blood of 15·6 g. Hb/100 ml. treated according to the method and set at the calculated depth shown above, and may replace a standard blood of this strength when used in the colorimetric method with the spectrum green filter.

Summary

Iron analyses and oxygen capacities of whole bloods and solutions of washed hæmolysed red cells were used to assess the accuracy of colorimetric hæmoglobin methods.

The cyanmethæmoglobin procedure was the most accurate method tested and is recommended for research purposes. The alkaline hæmatin and carboxyhæmoglobin procedures are a little less accurate, but are satisfactory for most purposes when subjected to accurate colorimetry. The alkaline hæmatin method is preferred for routine because it estimates abnormal as well as normal hæmoglobin.

Methods are described for determining hæmoglobin by the cyanmethæmoglobin, alkaline hæmatin and carboxyhæmoglobin procedures. The colour is assessed

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by reference to an Ilford grey screen using a green light filter.

This investigation has been assisted by a grant from the Medical Research Council, and was carried out at the suggestion of the Council's Analytical Subcommittee. Our thanks are due to Mr. W. Weedon and Miss Joan Cobbold for their assistance.

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EARLY REHABILITATION IN ABDOMINAL SURGERY [1]

ALAN SHORTER, MB SYDNEY, FRCS
SURGEON, EMERGENCY MEDICAL SERVICE

REHABILITATION is accepted as an essential part of the treatment of all ailments. Shortage of man-power has displayed its importance in war-time, and a comprehensive medical service after the war must provide for it.

Great advances have already been made by the Services with convalescent homes and depots for the final stages of rehabilitation, and by the Ministry of Health with special hospitals for long-term disabilities. But what of the *early* stages of rehabilitation and the short-term disabilities which predominate? Are we using all our facilities to the best advantage? Although early rehabilitation is well managed in many Service and civilian centres, loafing about hospital and being coddled at home are still far too common, at any rate among civilians. The vast majority of patients have no alternative and intelligent planning is needed on a large scale.

Rehabilitation needs not only surgical or medical skill but also "psychological management" [2] aided by physical medicine of all kinds. In abdominal surgery this means coöperation between surgeon, physiotherapist, general practitioner and nursing staff. What is wanted is not so much trained "rehabilitationists" [3] as collaboration of every member of the team with the surgeon. The patient must feel the sustained interest of his surgeon from his entry into hospital until his return to work. And without the general practitioner success is impossible.

At present, except in orthopædic cases, attempts at rehabilitation in surgery are too often relegated to the convalescent or even the post-hospital period. Confinement to bed is necessary after most abdominal operations, to allow for healing of the tissues; but serious harm may be done if patients are allowed to lie idle in bed for weeks, loaf about when ambulant, and then suddenly try to return to normal function. Too much stress is laid on restoration when convalescent and too little on preventing loss of strength and efficiency *while still in bed*. This most valuable time is being largely wasted and to make the best use of it the instruction must begin before operation. This should be possible in all except emergency cases. We can thus bring to the operating theatre a much more fit and confident patient, who realises the importance of the exercises he has already learnt to do while free from fear and pain. Prohibiting smoking and maintaining a clear airway from before operation should go far towards abolishing the "postoperative chest."

1. Based on a paper read at a meeting of physiotherapists of the London sectors.
2. Cairns, H. W. B. *Brit. med. J.* 1943, i, 313.
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Working along these lines for some fifteen months we have evolved a plan which achieves the desired results without apparent ill effects. It must needs be a broad outline capable of modification to meet individual needs both physical, psychological and clinical. Various schemes are already in use in some other hospitals, but I feel the principles could with advantage be more widely recognised and applied.

OBJECTS

Chest.—After abdominal operations most patients are afraid to breathe deeply, let alone cough, because deep breathing is painful and they are afraid of bursting their stitches. This fear is especially deeply embedded in the lay mind in relation to operations for hernia. It is a relic of the days when the postoperative hernia patient was kept flat on his back for three weeks and barely allowed to flicker an eyelid. But if sutures give way in the first days after straightforward operations there is surely something wrong with the suturing—or the catgut!

The need for early clearing of mucus from the bronchial tree to prevent the "postoperative chest" is obvious; yet this need is seldom met adequately. Both coughing and breathing can be carried out soon after operation, under skilled instruction, with great benefit. Coughing is relatively painless if the wound is held firmly, first by the instructor and then by the patient when taught to do it himself. It is essential to have a skilled instructor who can inspire confidence and allay the patient's fears; otherwise he will not coöperate. Coughing clears the airway, facilitates free breathing and prevents collapse of lung tissue. I have found it more effective than inhalation of carbon dioxide which, by producing violent involuntary respiration, may even cause mucus to be sucked deeper into the lungs. Since substituting coughing and voluntary breathing I have noted a substantial decrease in "postoperative chests" of all types after all kinds of operations under all grades of anæsthesia—general, spinal or local.

Circulation.—To prevent venous stagnation, thrombosis and embolism, the patient has long been encouraged to move about in bed. But how many do much in this way during the first few days except under direct supervision? Proper instruction minimises these risks by maintaining a mobile circulation.

Muscles and Joints.—Muscle tone and joint efficiency can be maintained by early *active* movement of the trunk and limbs, beginning on the 2nd or 3rd day after operation unless definitely contra-indicated. I firmly believe that early, gradually increasing, active movements—stopping short of pain—can do no harm to the patient as a whole or to the operation area. Avoidance of pain depends on skilled instruction and confidence. This early active treatment is the best way to maintain the general fitness of the patient, prevent the flabbiness usual after rest in bed, and do away with many of the minor ailments that accompany it, thus shortening convalescence. After proper instruction the patient can practise movements frequently by himself. This is far better than half an hour's massage and passive stimulation by the masseur, who is better employed instructing than rubbing! A patient thus trained in bed can walk quite well on first getting up, avoiding the jelly-legs phase formerly so common. Within a few days he goes to the gymnasium for further exercises and games, and most are fit for discharge within a week of getting up. By avoiding muscle wasting while in bed there is little leeway to be made up; he merely needs to become used to the change in posture and increased movements. I have had no sign of weak scars or incisional herniæ. He also escapes the pot-belly and intestinal stasis so familiar after rest in bed, as well as the abdominal belts sometimes prescribed. The latter should be reserved for paralysed muscles and inoperable herniæ, and never used for lazy or neglected muscles.

Morale.—An instructed patient does not feel a helpless invalid who has to be waited on. He escapes boredom and preserves his morale. He knows that he has a part to play in his recovery instead of lying inert in bed like a sack of potatoes. (This is a great boon to the nursing staff.) Interest is maintained when he begins to feel fit, for the competitive spirit is soon introduced into his exercises and games. This can be done in the wards

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as well as the gymnasium, and music is an invaluable adjunct. In prolonged cases occupational therapy may be needed to stimulate mental interests, and in all the aim is to achieve perfect coördination of mind and body and restore the patient as nearly as possible to full health, strength and usefulness. This can be achieved with all types of patient, who must be encouraged and inspired, not bullied. Such skilled work must be carried out with intelligence and understanding, and is very suitable for the recently trained masseuse or masseur.

METHODS

The scheme covers the preoperative and postoperative stages. Before operation the patient is instructed in breathing and coughing, and briefly in the movements he will be expected to do afterwards.

After operation the scheme is progressive.

1ST AND 2ND DAY

(1) Thoracic breathing. (2) Coughing. (3) Retraction of abdominal wall.

The chest is usually found to be rather rigid, and breathing shallow—perhaps difficult. The chest should be laterally expanded in inspiration and gentle forced expiration should be promoted by even steady manual pressure on the lower ribs. The volume of tidal air is soon increased and the chest wall becomes relaxed and more mobile.

For coughing, the patient is first assured that he will not burst his wound. Then gentle firm manual pressure is applied over the area and steady forced expiration is encouraged. Loose phlegm is usually expelled in surprising amount. This treatment is continued till the breathing is free and breath-sounds are clear.

3RD AND 4TH DAY

1. Abdominal contractions. The abdominal wall should be shortened in expiration, not merely held rigidly contracted. (2) Exercises for legs entailing movements at hip, knee, ankle and toe joints.

4TH AND 5TH DAY

(1) Stronger work for abdominal muscles and legs. (2) Movements for head and arms.

6TH AND 7TH DAY

The above exercises can now be done freely and with full range of movement, provided there is no contra-indication in chest or abdomen. Trunk exercises are added, such as flexion, extension, side-flexion and especially rotation. All retractions of the abdominal wall are performed with expiration.

8TH TO 14TH DAY

The patient does these exercises three times daily, the duration depending on his age and strength, stopping short of fatigue. Extension of back and legs is added—as in the erect posture with pressure of the feet on the foot of the bed.

AFTER 14TH DAY

More strenuous exercises for trunk and limbs, especially for muscles of back, abdomen, glutei and quadriceps.

On the 17th day after operation for hernia the patient is allowed up, if all is well. Also after paramedian incision for laparotomy, if there is no special reason for long recumbency. After appendicectomy via muscle-splitting incision the above exercises are speeded up and the patient is got up on the 10th day. He walks fairly well except for slight giddiness due to change of posture. Difficult walking and balancing exercises are then taught. On the 2nd and 3rd day up he is taken to the gymnasium to join a convalescent class for general exercises and games. Modified deck quoits is a suitable and popular start.

After being up a week he is in the advanced class and can do vigorous exercises without discomfort—e.g., play table-tennis or go for long walks and cross-country runs. He is now ready for discharge and in another fortnight at most should be fit for any kind of work. I see him after this interval, or again later if necessary, for a final review of his condition before starting work. It is essential, I think, that he should feel that he is still under the care of his surgeon until he returns to work, and even afterwards. This prevents any lapse in the continuity of his treatment when he leaves hospital, although, when at home, he is also under the surveillance of his general practitioner.

I wish to thank Dr. Francis Bach for the kind coöperation of his physiotherapy department in the evolution of this plan.

ACUTE NECROSIS OF THE LIVER

AN UNUSUAL CASE

E. R. VAN LANGENBERG, M R C P

TEMP. SURGEON LIEUTENANT, RNVR; MEDICAL SPECIALIST

THE reasons for describing this case are (1) that the liver necrosis followed prophylactic injection of yellow-fever vaccine; and (2) that the clinical course differed from that of other cases previously reported.

CASE-RECORD

The patient, a man aged 36, was inoculated with 0·5 c.cm. yellow-fever vaccine on Nov. 4. There was no local reaction at the site of injection to suggest infection from the needle or syringe, which had been sterilised in the usual routine manner. He remained quite fit until Nov. 14 (ten days after the injection) when he suddenly developed severe epigastric pain and began vomiting. His temperature rose to 103° F. As the day progressed his condition improved and the symptoms subsided. On Nov. 15 the temperature had returned to normal and he felt quite well. On the 16th, although he made no complaint, he was seen to be slightly jaundiced. On the 17th he suddenly became worse, his temperature rose to 100°, and he began to vomit again. He rapidly became delirious and was admitted to the hospital ship on the evening of Nov. 17. Nothing relevant was ever discovered in his past history. He had been in the "tropics" for nine months.

On admission he was so restless that it was impossible to examine him. He was given morphine gr. 1/6 to obtain rest for him. On examination later he was in a coma from which he could not be roused and from which he never recovered. The icteric tinge of the skin could be seen even in indifferent artificial light. There was no rash or hæmorrhages into the skin. The pupils, which were equal and contracted, did not react to light. No strabismus or nystagmus could be detected and the optic discs appeared normal. No head-retraction or neck stiffness; no facial assymmetry; reflexes brisk and equal; flexor plantar responses. No cardiac enlargement was noted and no bruits. Blood-pressure 150/100. Pulse: good volume, 104 and regular. Lungs: no clinical evidence of disease. Bladder distended, and up to umbilicus. No other abnormality found. Liver and spleen not palpable. The temperature was 99·4° F. and the respiration-rate 17.

A catheter specimen of urine was sent for examination, and samples of blood were taken for examination for malaria parasites and *Leptospira icterohæmorrhagiæ*. This was done on the night of admission, and in addition he was given intravenous glucose-saline by continuous drip. Next morning the coma was very deep; he was now incontinent of urine. Lumbar puncture was performed; the fluid was clear and not under pressure. At 9.15 PM there were generalised convulsions, with bilateral facial twitching between the fits, and at 9.20 he died.

In the short time between admission and death a few investigations were carried out:—

The urine (spec. grav. 1034) was acid, and contained a trace of albumin; Hay's and Gmelin's tests were positive; there were many fatty and epithelial casts. No malaria parasites or leptospiræ could be found on two examinations of blood-films. The white-cell count was 12,000, and the blood-urea (one estimate, unconfirmed) was 28 mg. per 100 c.cm. The cerebrospinal fluid showed no abnormality; cells 3 per c.mm.

The course of the illness may be summarised thus:—

Nov. 4: Injection of yellow-fever vaccine.
,, 14: Onset of illness.
,, 15: Felt better and temperature had settled.
,, 16: Onset of jaundice.
,, 17: Onset of delirium; admitted to hospital.
,, 18: Died.

In view of the clinical course of the disease, and the results of the investigations, it was considered that the patient had died of acute necrosis of the liver.

It was thought that death was due to acute necrosis of the liver, and a post-mortem examination was made early next morning. The night temperature was moderate, and important post-mortem changes are unlikely to have occurred.

The skin showed no petechiæ, ecchymoses or rashes. The general nutrition was satisfactory.

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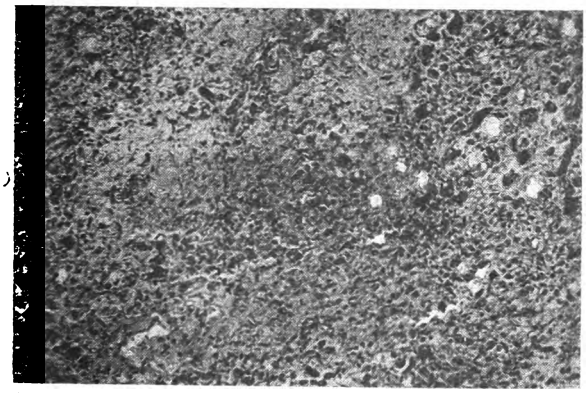
The bronchial tree contained much mucus, and when the lungs were sectioned and squeezed much mucus was exuded, but there was no consolidation. No hæmorrhages were seen on the pleural or pericardial surface, and there was no pericardial effusion. The myocardium was soft and slightly pale; there was no abnormality of the endocardium or valves. A submucosal hæmorrhage about the size of a florin was found at the pyloric end of the stomach, and there was some injection of the upper part of the intestinal tract.

The liver weighed only 30 oz. and its capsule was shrunken and wrinkled. On section it was found to be soft and friable. It was pale yellow; there were no depressions or elevations on the surface, and no red areas suggestive of congestion.

Microscopic examination showed gross necrosis distributed throughout the parenchyma (see figure). The whole section



Section of liver (× 100)

stains rather feebly with eosin which may be partly due to post-mortem change, but which is also characteristic. There is a very heavy deposit of pigment, most of which is intracellular. Fatty degeneration is not a feature nor is the organ congested. In one section (not illustrated) there were small areas of normal liver cells which had probably resisted or escaped the pathological process. With so short an illness they are not likely to be areas of regeneration.

The spleen was not enlarged or abnormal. The kidneys were congested; there was no difficulty in stripping the capsule, and no loss of cortex. Nothing unusual was seen in the brain and meninges.

The vaccine contains a living yellow-fever virus which has lost most of its virulence through prolonged cultivation in tissue culture. Week-old chick embryos are inoculated with the attenuated virus, and after 3 days' incubation they are removed from their shells and aseptically ground. The ground material is suspended in undiluted normal human serum which has been inactivated by heat. After centrifuging, the supernatant fluid is put into ampoules and sealed off in vacuo. Before issue, the vaccine is tested for sterility and virulence.

DISCUSSION

The clinical diagnosis of acute necrosis of the liver was confirmed post mortem. The possibility that the vaccine infected the patient with yellow fever is excluded by the very stringent tests of virulence carried out before the vaccine is issued, and also by the fact that there were no other cases. Infection from *Aedes ægypti* can be similarly excluded; there were no other cases, and the patient had not been in an epidemic or an endemic area. None of the factors recognised as causing "acute yellow atrophy" of the liver (e.g., pregnancy toxæmia or poisoning by alcohol, chloroform, TNT, phosphorus, arsenic or cincophen) can be seen in this case. We are left with infective hepatitis or the acute hepatitis which has been reported after injection of yellow-fever vaccine, the serum of mumps and measles convalescents, and blood. The main difference from other cases in this group is the very short incubation period and the very acute course of the illness.

The *incubation period* was 10 days, compared with 50–70 days for measles serum, 40–120 days (US Army) and 12–20 weeks (Brazil) for yellow-fever vaccine, and 8 weeks for post-transfusion hepatitis.

The *clinical course* was only 5 days; in measles serum hepatitis it was 5–10, and in the yellow-fever serum hepatitis it was 2–6 weeks.

Symptoms and signs.—In this case there were no rashes or hæmorrhages into the skin. The jaundice was not deep, but it did deepen after death. There was no blood in the vomit. The temperature chart was significant, in that there was a steep rise at the onset, followed by a fall, and in the terminal phase the temperature was not much raised (maximum 102° F.). The pulse-rate on the other hand rose to 160. The low temperature appears to be a recognised feature in this condition. There was no stiffness of the joints or bleeding (antemortem) from the mucosæ, which could be observed clinically. The termination in delirium, coma and convulsions is also characteristic.

Pathological investigations.—The urinary changes were in keeping with acute necrosis of the liver. The blood-urea was surprisingly low, and unfortunately it could be estimated only once.

Post-mortem appearances.—The necrosis was very extensive and there was little normal liver tissue left in the sections examined. There was no fibrosis to suggest previous liver damage.

In conclusion it should be mentioned that the medical officer who had charge of the case before the patient's admission to the hospital ship had himself been injected with yellow-fever vaccine at the same time. He had 24 hours' pyrexia with joint pains at about the 8th day, but no clinical jaundice. There were no other untoward developments with this batch of vaccine.

I wish to thank Dr. Sampson of the Union Health Department, Durban, for his help in making the slides, and his comments on the microscopic appearances of the liver; also Surgeon Captain K. A. Ingleby Mackenzie, RN, medical officer in charge H.M.HS., for criticism and advice, and to the Medical Director-General of the Navy for permission to publish the case.

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PERIPHERAL ARTERIAL EMBOLISM

L. W. C. MASSEY
M B LOND
ASSISTANT MEDICAL OFFICER, ST. OLAVE'S (LCC) HOSPITAL

P. STEINER
M D BRATISLAVA, M R C S
SURGEON TO THE HOSPITAL

TWO cases of embolism of the femoral artery are described. In both embolism followed the initiation of digitalis therapy in patients with mitral stenosis and auricular fibrillation.

CASE REPORTS

CASE 1.—A woman, aged 22, was admitted on Nov. 14, 1941, for severe ulcerative stomatitis. On examination she was found to have mitral stenosis and auricular fibrillation. She was treated with intravenous neoarsphenamine, and the gums were painted with 10% chromic acid. Potassium chlorate mouth-washes and ascorbic acid were given. For the cardiac condition she was given 0·5 mg. 'Digoxin' t.d.s. daily for three days, 0·25 mg. t.d.s. for one day and digitalis folium gr. 1 t.d.s. for three days. On Nov. 20 she suddenly developed a paresis of the left half of face and of the left arm. Cerebral embolus was diagnosed. Her pulse-rate had come down to 50 and digitalis was discontinued. On the same evening she complained of a sudden pain of a cramp-like nature in the left leg. No pulsation of the dorsalis pedis artery was found on that side and the pulse in the left popliteal fossa was almost imperceptible. The foot and leg were paralysed and pale.

Five hours after the initial symptoms, operation was performed under local anæsthesia. The left popliteal artery was exposed; a small incision into it produced only a small trickle of blood with no pulse waves. The wound was therefore closed and the femoral artery exposed in Scarpa's triangle. At the level of the origin of the profunda femoris artery there was a bulging and an elastic resistance caused by an embolus. There was marked pulsation above, but below the artery was contracted and showed no pulsation. Embolectomy was performed according to the usual methods. An incision was made just below the level of the embolus which was easily removed by gentle squeezing. Hæmorrhage was controlled by tapes passed round the artery. Wound, instruments, and

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the operator's hands were frequently washed with sodium citrate solution. The artery was sutured with vaselined silk.

After the embolus had been removed, the artery below the site of the embolus remained contracted and only a faint pulse-wave could be felt. No pulse could be felt over the popliteal and dorsalis pedis arteries. Next day patches of discoloration appeared on the foot and leg together with anæsthesia distal to the ankle-joint. On Nov. 22 digitalis was begun again. The limb became gangrenous and a mid-thigh amputation was performed on Nov. 25. Although the pulse-rate again fell below 60 on one occasion, no further embolism occurred and the patient made a good recovery.

CASE 2.—A woman, aged 28, on April 8, 1942, wrenched her right side while jumping on a bus. Later she noticed a gripping continuous pain in the lower part of chest on right side, made worse by deep breathing. On April 21 pain shifted to the left groin, but became much less.

Next day she was admitted to hospital, where she was found to have auricular fibrillation and mitral stenosis. There were no physical signs or radiological evidence of pulmonary embolus, and no tenderness or enlargement of the spleen. A provisional diagnosis of muscular strain was made. Digoxin was started on the first day, the patient being given 0·25 mg. t.d.s. On April 12 at 8.30 PM she began to complain of slight cramp-like pain in the right leg, which became cold, pale and paralysed, and was diffusely tender below the knee. The pulsation of the dorsalis pedis artery could not be felt on either side, but although the left popliteal artery could be felt easily there was no pulsation on the right side. Pulsation could be felt in both femoral arteries. On the left side femoral pulsation could be followed lower down than on the right. The right femoral artery showed a "thrusting impulse" as described by Heanley.[1] Operation was performed 3½ hours after the onset of symptoms, under local anæsthesia, and an embolus removed from the femoral artery at the same site as in case 1. The same spasm of the artery was observed as before, persisting after embolectomy. This time, however, the adventitia was stripped from the artery around the site of the embolus. The artery gradually dilated, and after removal of the adventitia for 1½ in. below and above the site of the embolus, the pulse-wave became full. The wound was closed. Immediately after the operation and for 4 or 5 days after it was noted that the popliteal and dorsalis pedis pulses on the operated side were much stronger than on the other side. The patient complained of numbness in the leg for a few days after the operation, but there was no pain or loss of sensation, and movements were normal. On April 21 she had sudden pain on the left side of the chest and at the base of the neck on the left side. Its distribution suggested pleurisy over the diaphragm, but no physical or radiological signs were found, and it cleared in a few days. A fortnight after the operation the pulses of the legs were equal on both sides, and further recovery was uneventful.

DISCUSSION

In case 1 embolism followed digitalis therapy for a week, after some 5·25 mg. of digoxin and gr. 8 of digitalis folium had been given. There were signs of digitalis overdosage including bradycardia and vomiting. In case 2 however only 2·5 mg. digoxin were given over three days and there were no signs of overdosage. Neither patient had been previously taking digitalis. Rapid occurrence of embolism after the initiation of digitalis therapy was notable. Though the quantity of digoxin given in case 2 was small, it was quite sufficient to have had some effect on the heart. We know, for instance, that a much smaller dose of digitalis will sometimes produce extrasystoles. We were therefore led to consider whether digitalis may be a factor in the dispersal of emboli from the left auricle or mitral valve. Standard works on the heart contained no reference to this question and did not say whether, in cases where emboli had already occurred, digitalis should be given. (The danger of embolism is, of course, well recognised in the case of quinidine).

An attempt was made to find similar cases on record, but though a great number of cases of embolism have been described, and a large proportion of these were inpatients with mitral disease, only a few accounts mention whether digitalis was given. In cases reported by Heanley,[1] Griffiths,[2] and Bedrna,[3] digitalis therapy began a few days before the onset of embolism, but in view of the insufficient data no conclusion can be drawn.

In case 1 the circulation of the leg failed to recover in spite of early embolectomy. In this case, as in case 2, after the embolus had been successfully removed and the flow of blood was free, the artery wall below the site of the embolus remained contracted. The spasm was extreme and apparently enough in itself to prevent blood from passing along the artery. This was confirmed by dissection of the amputated limb in case 1. There was no thrombus formation in the artery and the site of the incision in the popliteal artery was free from thrombus. When the sympathetic fibres were stripped from the site of the embolism the artery began to dilate and pulsation travelled down it. The dilatation was gradual and proportional to the amount of adventitial coat removed.

A series of methods have been used to deal with peripheral arterial embolisms: embolectomy; embolectomy plus lumbar sympathectomy; lumbar sympathectomy; infiltration of lumbar sympathetic ganglia, arteriectomy; drugs causing vasodilatation. Carcassone and Halmovici[4] advise embolectomy combined with stripping the artery of its adventitia as alternative to arteriectomy or lumbar sympathectomy. Local sympathectomy (Leriche) in cases of peripheral arterial disease with a spastic factor fell into disuse because results were unsatisfactory. The explanation given was that the stripping of the sympathetic fibres from a short section of the artery does not sever other fibres which join the artery at different levels.

We think that in the case of embolism the position is different. Here the peripheral spasm is due to local stimulation by the embolus, and after the removal of the embolus, the traumatised endothelium furnished the stimulus. After Leriche's operation, the afferent as well as the efferent fibres are removed and the area from which vasospastic stimuli can arise is denervated. It is because of the alleviation of the spasm which results from sympathetic paralysis that various workers have obtained good results from working with spinal anæsthesia; similarly the value of arteriectomy advised by such workers as Pampari in cases where the endothelium is damaged, probably depends on the removal of the focus of the irritating stimulus with a consequent relief of the spastic factor.

Embolectomy combined with local sympathectomy deals not only with the mechanical obstacle of the embolus, but is the simplest way to remove the spastic factor. It causes very little shock and has all the advantages of lumbar sympathectomy without being so extensive.

In addition to the above two cases we have had a third case of peripheral arterial embolism which we treated by embolectomy and local sympathectomy. The immediate results of the operation were satisfactory, but the patient died of his general condition 12 hours later. We append details of the case as matter of interest.

CASE 3.—A man aged 64, with mitral disease, was brought into hospital suffering from cardiac failure with regular rhythm. After admission he developed signs of embolism of the right external iliac artery. Embolectomy and local sympathectomy were performed under local anæsthesia about three hours after the onset of the symptoms. The embolus was reached by a retroperitoneal approach and was found at the origin of the right external iliac artery. It was "milked" down and removed two inches below its original site and local sympathectomy was carried out. The spasm of the artery was alleviated and the circulation of the limb restored.

On post-mortem examination the mitral valve was found to be narrowed, calcified and ulcerated. Atheromatous ulcers were found in the lower part of the abdominal aorta. No thrombi were found. At the site of the embolus the endothelium was roughened over a tiny area, but there was no thrombus formation. The endothelium at the incision was perfectly smooth and free from thrombus. The patient had a carcinoma of the pelvic colon (not causing obstruction) and there were two secondary deposits in the liver.

SUMMARY

In two cases of auricular fibrillation formation of emboli followed initiation of digitalis therapy.

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2. Griffiths, D. L. *Ibid*, 1938, ii, 1339.
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The question whether digitalis is a causative factor in the formation of emboli is raised.

The use of Leriche's operation is advocated where obvious spasm follows removal of the embolus.

We wish to thank the medical officer of health of the London County Council and Dr. Kelson Ford, medical superintendent of St. Olave's Hospital for permission to publish these cases.

SULPHAPYRIDINE ANURIA

TREATED BY UNILATERAL RENAL DECAPSULATION

F. L. KING LEWIS, MRCS, DCH

REGISTRAR, CHILDREN'S DEPARTMENT, WESTMINSTER HOSPITAL, AND HOSPITAL FOR SICK CHILDREN, GREAT ORMOND STREET

SEVERAL methods of treatment have been described in cases of anuria following the use of sulphonamides, and each may be applied in turn according to the stage and severity of the symptoms (Laird 1941).

If conservative treatment with the administration of fluids and alkalis fails, massage of the renal tract as described by Flynn (1943) seems worthy of trial. The next and most generally accepted method of treatment is ureteric catheterisation and lavage to displace concretions which are most commonly situated at the lower ends of the ureters. This, however, is not invariably successful, either for technical reasons or because the renal pelvis may be completely blocked with concretions; in these cases unilateral nephrostomy with the passage of sounds down the ureter is probably the method of choice (de Lacey et al. 1943).

Finally, there are cases which do not respond to clearance of a block in the lower part of the renal tract, or in which concretions cannot be demonstrated. This group is almost certainly due to precipitation in the collecting tubules (Antopol et al. 1941), and it is here that renal decapsulation, with consequent relief of tension in the kidney, is most likely to meet with success. The following case describes the application of this method.

CASE-RECORD

A boy, aged 4 years, was admitted to hospital with signs of pneumonia in the right lower lobe. Temperature 102·4° F. The urine showed no albumin, pus or blood. Sulphapyridine was ordered, 1 g. four-hourly for two doses, then 0·5 g. four-hourly, and the temperature responded rapidly, falling to 98·4° F. on the second day. Fluid intake, which was ample for the first 24 hours, later fell when vomiting began. On the morning of the third day, after a total of 8 g. of sulphapyridine had been given, bloodstained urine was passed. The drug was stopped immediately and fluids and alkalis administered in large amounts, but in spite of this on the day after the hæmaturia only 3 oz. of urine was passed. This showed many red cells, but no crystals or casts. On the second, third and fourth days after the hæmaturia suppression of urine was complete. The blood-urea on the fourth day was 60 mg. per 100 c.cm. and the blood-pressure 120/80 mm. Hg.

Cystoscopy was carried out by Mr. Twistington Higgins at this stage. The bladder was empty and the mucosa showed areas of inflammation and patches of a white amorphous but refractile material. The left ureteric orifice looked inflamed, with a white speck in the centre. A ureteric catheter was passed a short way but met with resistance, and though a dark clot was displaced no urine was obtained. The right orifice was located with difficulty and appeared œdematous and surrounded by a mucoid substance; it was impossible to introduce a catheter.

The anuria still failed to respond and by the next evening the blood-urea had risen to 160 mg. per 100 c.cm. and the blood-pressure to 130/80 mm. Next morning, after five days in which only 3 oz. of urine had been passed, a further operation was decided on and the right kidney was exposed. The renal pelvis appeared œdematous but not distended, and the kidney was enlarged. Microscopic examination of urine removed from the pelvis by syringe showed many blood-cells, but no crystals or casts. The pelvis was opened but little fluid was obtained, and when a bougie was passed down the ureter practically no resistance was encountered. Consequently it was decided that nephrostomy and lavage alone would be unlikely to improve the condition. The renal capsule was therefore stripped and the pelvis drained.

Eight hours after operation the dressings were soaked with urine, and 21 oz. was passed per urethram during the night. This urine showed a trace of albumin, many red cells and a few epithelial cells, but still no crystals or casts. Sulphapyridine estimation was as follows: free 200 mg., total 250 mg. per 100 c.cm. (Unfortunately blood-sulphonamide levels were not carried out at this time because of war-time shortage of laboratory staff.) A day later the blood-urea had fallen to 54 mg. per 100 c.cm.

The child made an uninterrupted recovery. Before his discharge three weeks after operation the blood-urea was 29 mg. per 100 c.cm. and the Addis count normal. Intravenous pyelograms showed that the right kidney functioned well, but concentration of dye in the left kidney was slightly reduced.

I would like to thank Dr. Donald Paterson for permission to publish this case.

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ASEPTIC CAVERNOUS SINUS THROMBOSIS

WITH RECOVERY

H. S. LE MARQUAND, MD E. G. RECORDON, MD

MAJORS RAMC

THE subject of this note is a man of 29, who developed, for no usual or indeed certain reason, a cavernous sinus thrombosis from which he made a speedy and complete recovery.

On Jan. 31, 1943, he sustained a hard blow on the right eye from a soccer ball. He continued the game after a few seconds "blackout" and it was not until next morning that he became concerned about his vision. He was admitted to the Military Hospital, Colchester, on Feb. 2, with a "commotio retinæ" (right). The skin of the eyelids and adjoining regions was not discoloured or injured; the conjunctiva was only slightly injected. The cornea was intact and the pupil under atropine. There was much œdema and some fine hæmorrhages in the macular and central retinal areas. A preretinal hæmorrhage, some 2 mm. in diameter, obscured the juxtapapillary course of the superior temporal vessels. Treatment ordered was rest in bed, atropine drops and mist. potassium iodide.

On Feb. 6 he complained of sore throat and developed a temperature of 101·8° F. The pharynx was congested and a throat-swab culture grew hæmolytic streptococci. After treatment with 8 g. sulphapyridine signs and symptoms disappeared. On Feb. 11 he appeared very well but stated that he had a slight mid-frontal headache and slight pain in the eyes. In the course of the afternoon of the next day these symptoms were more pronounced and were increased by movement of and pressure on the eyes. No new physical signs were noted. Temperature 99·0°.

On the morning of Feb. 13 he was obviously gravely ill. A diagnosis of bilateral cavernous sinus thrombosis was unhesitatingly made. Both eyes were proptosed, the left very slightly more than the right. The eyelids were œdematous; the conjunctivæ chemosed and congested. Ocular movement was restricted in all directions and accompanied by severe pain. Deep mid-frontal and retro-ocular headache was intense. The left pupil reacted normally and no change was observed in the fundus picture in either eye. There was no neck rigidity and no abnormal neurological signs. The ENT specialist (Major G. Waring Robinson) found a slightly reddened left eardrum but no other abnormality. Skiagrams (repeated during convalescence) showed no disease of the accessory nasal sinuses nor fracture in the base or orbits. Examinations of the blood (including cultures), cerebrospinal fluid and urine gave normal results. The temperature did not rise above 99·0° and at no time during this stage of the illness did it exceed 99·4°. The pulse-rate ranged between 70 and 90.

Signs and symptoms increased during the day of Feb. 13 but there was little change overnight and no change during the next 24 hours. On the 15th he felt better and symptoms were regressing although the signs did not start to subside until the 16th. Thereafter improvement was rapid and on

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the 18th there was no proptosis, only slight conjunctival œdema, and the ocular movements were full and painless.

We do not wish to stress or detail the treatment given, for it seems unlikely that it appreciably influenced the course of the illness. He was given a total of 10 g. sulphapyridine on Feb. 13 and 14. He vomited several times. On the evening of the 14th he was seen by Brigadier R. Priest, who agreed with the diagnosis and suggested that sulphathiazole should be tried. This drug was discontinued on the 17th after taking 15 g. Two injections of morphine (gr. ¼) were given and three of 'Omnopon' (gr. 1/3). We decided against trying heparin. Penicillin could not be procured, nor could leeches.

On March 1 he was discharged from hospital fully recovered except for some residual retinal disturbance in the right eye (visual acuity 6/6 partly).

A completely satisfactory explanation of the case is not possible. It seems to us most likely that the trauma gave rise to an aseptic clot in either the superior or inferior right ophthalmic vein (not to be confused with the retinal veins) and that this clot spread to the right cavernous sinus which communicated very freely with the left. The proptosis, however, occurred simultaneously in both eyes and if anything it was more pronounced in the left. As the blow was not severe and radiography of the skull showed nothing abnormal, injury to the sphenoid is unlikely, although it cannot be excluded. The only other apparent possible origin was the acute streptococcal pharyngitis. The sulphapyridinised organisms might have reached the cavernous sinuses from the throat via the pterygoid plexus of veins. But to link such a common disease with one so rare (and especially when the causative organism is the streptococcus) is justifiable only in the absence of any alternative explanation.

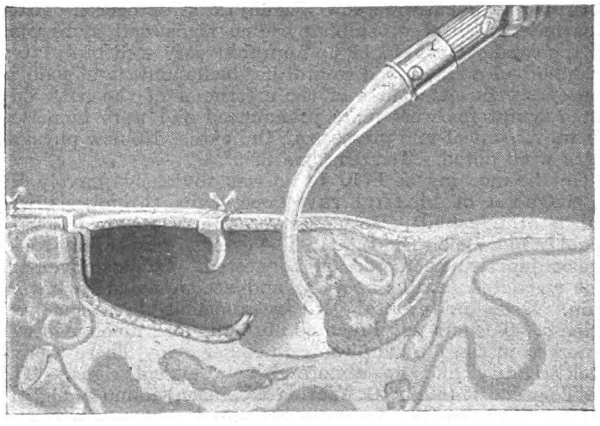
We are indebted to Lieut.-Colonel H. A. Rowell, RAMC, for permission to publish this case.

New Inventions

ILLUMINATED PROSTATIC RETRACTOR

NOWADAYS it is considered essential to inspect the prostatic cavity after removal of the pathological enlargement by open operation. Such inspection enables one to tie off the arteries constantly found in the posterolateral wall of the prostatic cavity, an essential step in the reconstruction of the cavity and completion of a closed prostatectomy if desired.

For this purpose the 'Coldlite' prostatic retractor here illustrated has been designed. The instrument is planned



on the lines of the excellent Morson anterior retractor with much the same angulation. The advantage of this model over Morson's is the magnificent illumination without the worry of a lamp, which is delicate and liable to go out of order. It also has all the advantages of other coldlite retractors in that it can be boiled, is unbreakable and remains cold even during long use.

I wish to acknowledge the coöperation of the makers, Messrs. Vann Bros., of Weymouth Street, W.1, from whom the instrument can be obtained.

RUPERT CORBETT, M CHIR.

Reviews of Books

Blood Cholesterol Content

In Myxœdema and Other Conditions. E. H. STOKES, MB SYDNEY, FRACP, senior hon. assistant physician, Sydney Hospital. (Australasian Medical Publishing Co. Pp. 121.)

THIS monograph was Dr. Stokes's MD thesis. He studied 400 cases, including myxœdema, thyrotoxicosis and other endocrine disorders (simple goitre, acromegaly, tetany, menopause, diabetes mellitus, obesity), xanthomatosis, Bright's disease, and jaundice. He considers the normal range of the serum cholesterol to lie between 160 and 230 mg. per 100 c.cm., so he applies the terms "hypercholesterolæmia" and "hypocholesterolæmia" to figures greater than 250 and less than 150 mg. He found the serum cholesterol high in myxœdema, diabetes mellitus, xanthomatosis and Bright's disease. The findings in thyrotoxicosis were conflicting: in 40% of cases it was low, and there was hypercholesterolæmia in 6%; no inverse relationship was noted between the basal metabolism and the blood cholesterol. The clinical observations on myxœdema were supplemented by experiments on rabbits, monkeys and dogs, in all of which thyroidectomy was without effect on the serum cholesterol. Measurement of the basal metabolism would have been of value here in order to confirm what degree, if any, of myxœdema was produced experimentally. A comprehensive list of references should prove useful.

Methods for Diagnostic Bacteriology

(2nd ed.) ISABELLE G. SCHAUB, AB; M. KATHLEEN FOLEY, AB. (Kimpton. Pp. 430. 18s.)

THIS American book gives detailed instructions for identifying the common pathogenic bacteria. Written for medical and technical students it describes the practice followed at the Johns Hopkins Hospital, but most of the methods recommended are used in all bacteriological laboratories. In the first edition it often seemed that several days were needed to identify the common pathogens, but a new chapter dealing with colonial characteristics helps to clear up this false impression. There are several details with which not all bacteriologists would agree. It is doubtful whether the absence of stormy fermentation in milk excludes the presence of *Cl. welchii*, and while beta-hæmolytic streptococci usually show a wider zone of hæmolysis on blood agar than *Staph. aureus* the point has little value in differentiation. Methods for identifying some of the important pathogens might have been better described and one would have thought it more important for the student to differentiate mitis and gravis strains of *Corynebacterium diphtheriæ* than to recognise *Strep. zymogenes* from *Strep. liquefaciens*. The section on serological methods covers the ground well and there are many useful recipes for the better known bacteriological stains and media.

Las Mastopatias Hormonales

ANTONIO EGÜES, surgeon to Institute of Clinical Surgery, and joint professor of surgical pathology in the Faculty of Medical Science of Buenos Aires. (Frascoli. Pp. 190.)

THIS small book gives a lucid account in Spanish of the effects of ovarian secretions on the human mamma. The normal development of the gland is traced through intra-uterine life and childhood until puberty. A description follows of the evolutionary changes which take place in the breast after this time and throughout the sexually active stage of life until the menopause; these changes are correlated with the varying hormonal activities of the ovary at the different phases of the menstrual cycle. Under the title of hormonal mastopathies, that is to say pathological conditions dependent on ovarian influence, are included adolescent mammary hypertrophy, premenstrual mastodynia, fibro-adenoma, and cystic mastopathy. In the final chapter the eventual fate of mammary cysts (dilated ducts) and their possible association with cancer are discussed. The descriptions are well illustrated by microphotographs. The author gives little space to the various factors, including œstrogen, which have been found by experiment to be concerned with the development of mammary cancer in mice, his remarks being confined almost entirely to the human subject.

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THE LANCET

LONDON: SATURDAY, FEBRUARY 19, 1944

THE WHITE PAPER

THE long-awaited exposition of the Government's plans for a national health service will probably be presented to Parliament soon after we go to press. Hence we must reserve comment for a later issue, when the outlines of the scheme will already be generally familiar. After two or three weeks copies of the white-paper (in full), provided for that purpose by the Ministry of Health, will be sent by the British Medical Association to every member of the profession at home or overseas, together with an analysis and a questionnaire. Thus every doctor will be invited to state his opinion of the proposals before the association calls its own representative meeting to discuss its answers. In preparing these proposals the Government have taken pains to find solutions acceptable to the profession as well as to other sections of the community directly concerned. The result therefore, for better or worse, must be a series of compromises, and only by a miracle could please everybody. What we must chiefly consider is whether the better health service now envisaged is such that it can grow into the best possible.

POVERTY AND CHILD BEARING

THOSE who heard the Secretary of State for Scotland heckled by members of Parliament over the Orr report must have wondered why it is an adventure so hazardous to be born north of the Tweed. The summary of this report on another page, with its admission that every year some 5000 Scots infants are born only to die, when under reasonably good conditions they would have grown up, throws some light on the reason. Taken by and large, poverty must be recognised as Enemy No. 1: poverty which starves the fœtus in the womb, deprives the infant of its natural food, and exposes it to the risk of mass infection in the overcrowded home. An investigation on a smaller scale, in the city of Belfast, corroborates this association of poverty with loss of infant lives. Well-to-do parents, who can buy the fruits of knowledge, have infant-mortality rates approaching the lower limit at present attainable. The poor suffer from the failure of society to make that knowledge operative throughout the social structure. No-one will contest the justice of this hard saying.

So far is common information, documented it is true by a wealth of evidence as never before; but what is lacking is a line of approach which will reveal the ways in which poverty acts and how these are to be stopped. It does not help much to be told that "prematurity and congenital debility" are the principal causes of neonatal deaths unless we go on to find out why labour is apt to set in early among the poor, and why full-term infants are born so weakly that they cannot survive their first month. That knowledge simply is not there. SPENCE, in an investigation of 272 infant deaths in Newcastle-on-Tyne during 1939, was driven to the conclusion that in a third of them the death certificates were so inaccurate as to be misleading. Infection is generally recognised as a main cause of death in infants between 1 and 12 months, but as MCNEIL, MACGREGOR and others have shown, even a healthy full-term infant may die within 48 hours of birth from an acute infection, and when an underfed, anæmic or rickety infant succumbs to an infection, death is often attributed to the infection without any reference in the certificate to the nutritional defects which made it so deadly.

Fundamentally, the whole problem is largely a matter of human nature. The loss of a child must be regarded not merely as a waste, but also as a subject of human distress, broken hopes and misery. The people living in ramshackle, discouraging houses or tenements are not just unsatisfactory tenants and disappointing parents: they may be people who, however valiantly they started, have almost or quite given up hope of rearing a happy, healthy family, or of enjoying their home life. There is little use in health education (another telling phrase) if the principles cannot be practised. It is waste of time to instruct a mother in the proper way to prepare and keep her baby's feeds if she leaves the clinic to return to a home devoid of indoor water-supply or larder accommodation; nor will the sending of more health visitors improve her home. Inability to buy adequate food, shelter and clothing is a stark, inescapable fact. Who can measure the degree to which existing social conditions undermine the mother's morale and diminish her confidence and competence to look after her children?

And there is another human factor. The essential thing in any service is recruitment and training of personnel, and provision of such conditions of work that interest and enthusiasm can be maintained and kept fresh. Number of clinics, says the Orr report, does not guarantee adequacy of service. The amazing success of the TRUBY KING child welfare service in New Zealand was due to the fact that it was started and directed by an enthusiast who knew his job, never lost interest and that his agents were trained nurses in the home. Something similar was achieved in Rochdale when TOPPING was medical officer of health there; and in his Charles West lecture PARSONS told of a reception area in which there were 11,241 confinements with a stillbirth-rate of only 17, and a first-fortnight death-rate of only 5·8 per 1000 live births; in Scotland there are places in which overcrowding and unemployment cannot be blamed for the high mortality-rates. Of course it is impossible to screw all the people up to the mark all the time; but it is to be feared that ordinary men and women are already becoming hardened again to the "heaping up of adverse conditions," seen (say) in Glasgow or Belfast. The cry of "better housing" and "better food" is beginning to lose its edge, and local authorities as well as other people need something pointed to stab their spirits broad awake. "In Scotland the housing position is so bad that it cannot wait on formal town planning. There should be a temporary housing scheme to take the people out of the congested areas." Here is indeed priority claim for one of Lord PORTAL'S emergency measures. But must we not, at the same time, have clear guidance as to the requirements in a house into which a baby is to be born, and as to the essentials of a home with 2, 3, 5 or 10 children? A first approach would be to recondi-

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tion houses to make them fit to live in, and to license them to hold no more than a certain number. It would then be possible to estimate the number for whom temporary accommodation must be found, and at the same time to make a start with permanent housing schemes. And the concentration on housing is none the less urgent because, as Sir JOHN ORR told the Fabian Society last Saturday, infant mortality has in fact diminished during the war because of better nutrition.

BETTER HÆMOGLOBINOMETRY

BIOCHEMISTS attached to medical departments have for long been deploring the awful crudity of the methods by which hæmoglobin is estimated in the average clinical laboratory; they point out that the popular methods use "continuous dilution" up to the end-point, a technique that has been abandoned as too inaccurate for all other analyses in medical biochemistry. The alternatives offered are: visual colorimeters, visual photometers and photoelectric instruments. The visual colorimeter is the usual instrument of the Duboscq type found in every biochemical laboratory; the depth of the unknown solution is varied and the colour matched against a standard so that the two halves of the eyepiece field show equal depth of colour. In the visual photometer, light of a narrow spectral band is passed through unknown and standard; the amount of light passing through is adjusted by means of a variable neutral wedge or similar device until the two halves of the eyepiece field are of equal brightness; a simple instrument of this type was described in these columns about a year ago.[1] The photoelectric instruments use the same principle as the visual photometer, but substitute the photoelectric cell for the human eye; in the simplest form the deflection of a galvanometer produced by a light placed at a constant distance is noted; the solution to be estimated is placed in the circuit and then the distance the light has to be moved nearer the cell to restore the galvanometer reading to its original value is measured; from this distance the amount of light absorbed, and so the amount of hæmoglobin present, can be calculated; a relatively simple instrument of this type has recently been described by BELL and GUTHMANN.[2] There are also more elaborate instruments employing two photoelectric cells in balanced circuits, and these have some advantages.

Even in their simplest forms, these methods require much more expensive apparatus than the Haldane or Sahli methods. Most clinical laboratories have enough work to make it necessary to have at least one piece of apparatus given up solely to hæmoglobin estimations; a microcolorimeter used exclusively for the purpose would be expected to pay its way in increased speed and accuracy. BELL and GUTHMANN'S "simple inexpensive photoelectric hæmoglobinometer" needs a galvanometer, a piece of apparatus that is not part of the normal equipment of the average clinical laboratory. Commercial photoelectric instruments cost, when purchase tax is added, in the neighbourhood of £100. Under present conditions, quite apart from cost, such apparatus is often difficult and slow to get. The clinical pathologist not unnaturally asks what advantages will accrue from all this elaboration—are the methods we use now seriously less accurate than these newer techniques; will they help towards more accurate diagnosis and better estimation of response to treatment? The answer to this last crucial question seems to be, not much. There is no doubt that the photoelectric hæmoglobinometer can give consistent results of high accuracy, but such accuracy, however desirable for experimental work on shock for instance, is out of place in clinical work where there are so many variables that an accuracy within 10% is good enough. KING, GILCHRIST and DELORY in this issue compare the results of the most accurate methods, checked against iron estimations. Their figures show little significant difference in the accuracy of the alkaline hæmatin, carboxyhæmoglobin and cyanmethæmoglobin methods carried out under the best conditions; the last-named is the best. The carboxyhæmoglobin method carried out by Haldane's technique is significantly less accurate than these first-choice methods, but in their hands is still well within the desirable limits for clinical accuracy. There is also the point that what is gained in accuracy may be lost in robustness and constancy of adjustment.

Under these circumstances the decision of the Medical Research Council's shock subcommittee[3] to support, for clinical use, the well-tried Haldane and Sahli techniques is practical and expected. Standard apparatus for the Haldane method now exists and should always be used. Standardisation of the Sahli method is very necessary for use where carbon monoxide or coal-gas is not available. In spite of the unsatisfactory nature of the brown colour and the uncertainty that the colour will fully develop, it should be possible to devise a standard technique and apparatus, preferably of the Hellige-Wintrobe type, in which a continuously variable wedge of brown glass or a set of glass discs is provided, thus avoiding the necessity of diluting with water to obtain a match; and WINTROBE has pointed out that 95% of the colour develops in the first 10 minutes. All the same, it will not be surprising if compact photoelectric hæmoglobinometers become popular when times are more normal.

OCCUPATIONAL THERAPY

DURING the 1914–18 war occupational therapy in Great Britain grew from infancy to lusty childhood. Afterwards it suffered from inanition, and by the beginning of the present war it had a stunted meagre aspect. It is to the credit of the Ministry of Health that its importance was then again recognised and plans were made for its proper development. Nevertheless we still have much to learn about a method which for twenty-odd years has been used only in mental hospitals and a few orthopædic centres, and desultorily at that. In the United States during the interwar years it has grown and prospered, and a manual[4] published by various interested bodies will open the eyes of many workers in this country to its possibilities.

The authors classify occupational therapy as diversional, remedial, or pre-vocational. In order that

1. *Lancet*, 1942, ii, 315.
2. Bell, G. H. and Guthmann, E. *J. sci. Instrum.* 1943, **20**, 145.
3. *Brit. med. J.* 1943, i, 209.
4. Occupation Therapy. Prepared by the council on physical therapy of the American Medical Association, the committee of the American Occupational Therapy Association, and the subcommittee on physical therapy and the committee on information of the Division of Medical Science of the National Research Council. Published in *War Med.* 1943, **3**, 512.

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ay be properly coördinated with physiotherapy
advise that the two departments should be
cted by the same physician. In England we
largely on remedial exercises to restore function,
the masseuse dominates the picture. In America
hold that an activity which takes attention away
n the disability stimulates physical recovery
ter than an uninteresting exercise which keeps the
ient's attention centred on his damaged limb.
er preliminary heat and massage—which seem to
he only forms of physiotherapy used—the patients
at once given active exercise in the form of occupa-
nal therapy. Those with surgical and orthopædic
abilities begin such exercise while still in bed.
soon as a patient can use the injured part actively
is made to understand that restoration of function
nis own responsibility, and an occupation is pre-
ibed that will meet his needs. Types of activity
suit various disabilities are discussed at length in
e manual. The patient with a weak deltoid for
ample should work with his arm suspended at
oulder level. External rotation at the shoulder-
nt may be increased by using a screw-driver with
e arm abducted to 45°, and the range of pronation
d supination may be enlarged by using a screw-
iver with the arm held against the body. Patients
th stiff fingers use tools with large handles, the size
the handles being reduced as flexion of the fingers
creases. Patients with fractures of the lower limb
n exercise the knee, hip and ankle without weight-
earing and with correct alignment using the bicycle
etsaw; by means of straps attached to the pedals
ney can be made to do a pulling exercise, using their
exors only.

The advantages of combining remedial exercises
ith occupational therapy are still appreciated in only
few British hospitals. The EMS memorandum[5]
n the organisation of rehabilitation in hospital,
hich appeared a few weeks ago, emphasised the
dvantages of using both methods and drew attention
o the value of carpentry, wood-sawing, gardening and
og-splitting, as well as light handicrafts, in a remedial
programme. In some EMS hospitals—Ashridge,
Horton and Orpington are examples—the occu-
pational remedial principle has already taken a
firm hold; others have used handicrafts merely as
a means of amusing the patients—no mean purpose
in itself. Possibly the bias may have swung rather
too far in America; occupational therapy alone
cannot, for example, replace a proper scheme of
remedial exercises such as Mr. SHORTER recommends
(p. 243) for keeping a bed patient fit, and there is a
place for exercises in many surgical and most ortho-
pædic cases. In the engineering department attached
to the Birmingham Accident Hospital the value of
planned occupational therapy for specific injuries has
been proved; and cases treated by both methods
have done better than those treated by exercises alone.

The American manual also covers occupational
therapy in arthritis, tuberculosis, heart disease and
psychoneurosis. The method has long lost its asso-
ciations with arty-craftiness and embraces all activi-
ties which have curative properties, whether handi-
crafts, engineering, carpentry, gardening, athletics,
music, acting, reading, or a share in hospital industries.
A well-balanced programme gives opportunities for
work, rest, recreation and social life. There should
be no necessity for boredom, but on the other hand
the day must not be made so full that the patient
cannot relax, and read and write, and even think if
so disposed. A good library and librarian are in-
valuable, and so are educational facilities for those
who have to stay in hospital a long time. Nor must
"welfare" be neglected. As WATSON-JONES[6] puts
it, "The diversional therapy that a man needs is the
knowledge, the certainty, that his wife is not in debt,
that his children are not starving, and that he has
time to develop his muscles. ... ."

A handicap to wider application of the method is
the lack of occupational therapists trained in remedial
work. A similar want is reported in America[7] where
it is aggravated by the expanding demands of the
fighting services. Training of new therapists, how-
ever, cannot be rushed, for it must not be narrow.
Hitherto, perhaps because most of our occupational
therapists are women, we have concentrated on the
lighter handicrafts, such as sewing and toy-making,
rather than on serious carpentry, for example, which
really affords better exercise both for arms and legs.
The lighter occupations are valuable especially
where occupational methods are used largely for
their diversional value; but where they are used as
a part of remedial treatment the therapist also needs
orthopædic experience and must be able to adapt the
work to suit the patient's disability. In this country
such workers may well be recruited from members
of the Chartered Society of Physiotherapy or from
among orthopædic nurses. Their training cannot
begin too soon, for lack of personnel is at present
the chief obstacle to progress.

BART'S MEDICAL COUNCIL CENTENARY

IN July, 1843, the governors of St. Bartholomew's Hospital decided to set up a medical council to advise them, the treasurer and almoners on questions relating to the hospital and medical school. At first the council consisted only of the senior members of the staff, with a junior man as secretary, but by 1870 it included all the full and assistant physicians and surgeons and the physician accoucheur, and all permanent staff have since been members. There was a rule in the early days that no-one could be on the council if he lectured or was in any way connected with another school. The council is freely consulted by the administrators of the hospital and it nominates representatives to the house committee and to the election committee which fills vacancies on the visiting staff. Nominated members also attend the court of governors, though they cannot vote. In this way, as Norman Moore puts it in his great history,[8] the staff are "made fully acquainted with all the business of the hospital, and enabled to exercise a due influence therein so far as medical affairs are concerned."

Prof. B. A. MCSWINEY will deliver the Oliver-Sharpey lectures at the Royal College of Physicians of London on Thursdays, March 2 and 9, at 4 PM. He is to speak on afferent fibres of the abdominal viscera.

Sir GOULD MAY, consulting surgeon to the Grosvenor Hospital for Women, died at his home at Clare, Suffolk, on Feb. 12. During the last war he served as physician to the Anglo-Russian Hospital in Petrograd. He was the son of a former Lord Chief Justice of Ireland, and died within a few days of his 81st birthday.

5. See *Lancet*, Jan. 8, p. 62.

6. Watson-Jones, R. W. *J. Chart. Soc. Physiotherapy*, January, 1944, p. 72.
7. *J. Amer. med. Ass.* 1943, 123, 639.
8. History of St. Bartholomew's Hospital, London, 1918, vol. II, p. 808.

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Annotations

RED CELLS AS WOUND DRESSINGS

THE possibility of using the human red cells left over after the production of plasma as a dressing for wounds has been suggested, and put to limited clinical trial, by J. J. Moorhead and L. J. Unger.[1] Pooled red cells, collected and stored aseptically, form a sloppy gelatinous mass which dries leaving a protective veneer over a wound; the application is painless, and purulent infection is said to subside under it while smooth healthy granulations are developing. Encouraged by the success of the gelatinous cell mass in an infected postoperative wound, T. H. Seldon and H. H. Young[2] have extended the clinical trial employing a dried and powdered red-cell concentrate. The powder was applied once or twice daily. In cases of pre-existing infection a noticeable odour was sometimes produced; in others, application of the powder produced such severe, irritating, burning pain that the treatment was discontinued; but in three cases that are specifically mentioned the powder gave good results. Seldon and Young claim that the results are sufficiently promising to warrant more investigative work, and one line they suggest is on the use of bovine red cells in place of human.

THE COCOANUT GROVE DISASTER

THE Cocoanut Grove night club in Boston was destroyed by fire with the loss of 491 lives on Nov. 28, 1942. Massachusetts General Hospital received 114 victims within two hours of the disaster; 75 of these were either dead on admission or died within fifteen minutes; 7 of the remainder died between twelve and sixty-two hours after admission, and another committed suicide thirty-eight days afterwards. Massachusetts General Hospital was fortunate in that, thanks to Pearl Harbour, far-sighted plans had been made to meet such a disaster. Moreover, a government inquiry into infection in burns had been started several months before. In consequence the hospital was ready to receive the patients and avail itself of the vast amount of clinical material suddenly provided. Every aspect was studied—administrative, therapeutic, metabolic, neuropsychiatric and pathological—and the results published as a symposium.[3] The administrative requirements agree in all material respects with those found necessary in this country when receiving air-raid casualties. The needs for an experienced medical officer in the receiving centre, isolation of the patients in a separate unit, the establishment of shock therapy teams and an information bureau, rapid identification of the living and the dead, and the early publication of a list of survivors are all recognised.

The burns involved the exposed parts of the body. The face and hands were most commonly affected, but in women with low-cut gowns the shoulders and back were also burned. No fractures or complicating injuries were recorded, but the presence of irritant gases was suspected from the frequency and severity of the pulmonary complications, the common loss of consciousness for an hour or more, and a lesion of the occipital lobe suggestive of CO poisoning. The burned surfaces were for the most part covered with blackened but unruptured blisters. From the rate of subsequent healing it can be deduced that 10 patients received full-thickness third degree burns while the remainder suffered first and second degree burns of varying severity. All the burned surfaces were covered with a boric ointment gauze of fine mesh without preliminary cleaning or debridement. Unruptured blisters were left. The dressings were changed between the fifth and tenth days and boric ointment reapplied. Boric ointment was chosen because it is a bland substance which is readily obtainable in hospitals, and because it is thought to have an inhibitory effect on the *Bacillus pyocyaneus*. No local sulphonamide chemotherapy was used; instead every patient received 2 g. of 5% sodium sulphadiazine intravenously as soon as possible after the disaster, followed by 4 g. daily by mouth or intravenously in divided doses. In this way local treatment was made as simple as possible—an important point in dealing with large numbers of cases. The results seem to have justified the technique. All second degree burns were healed in ten to seventeen days and the infection of the third degree burns was in every case limited to the devitalised tissue. The ritual of cleansing and debridement was forgone because it was thought that it could not reduce contamination materially and that unruptured blisters protected the underlying tissues. Local chemotherapy was not used on the grounds that satisfactory tissue concentrations could be maintained by injection; this assumption was proved correct by the demonstration of an identical content of sulphonamide in aspirated blister fluid and in the patient's blood. The success of such simple measures is a salutary reminder that interference should be reduced to a minimum so as to avoid secondary infection and save the patient unnecessary pain.

Penicillin was given to 11 patients between the sixth and fourteenth day, because of persistent pyrexia; 5000 units was given intramuscularly every four hours. It is now realised that this dose was far too small to be beneficial—about 15,000 units is needed intramuscularly every three hours to maintain a therapeutic concentration, or 100,000 units in twenty-four hours when given intravenously. The failure of sulphonamide chemotherapy or penicillin to overcome infection by *B. pyocyaneus* is well recognised and this organism is a frequent contaminant of burned surfaces. If the claim that boric acid is valuable for this purpose is substantiated, it will constitute an important advance in the technique of sterilising wounds and burns. But it must first be proved that there is no risk of poisoning from absorption of boric acid. The ointment here used contained 10% of boric acid in soft paraffin. From experience with sulphonamide creams it is known that the extensive burns of modern warfare require an average of 6 ounces of ointment to cover them. This means the application of 18 grammes of boric acid to such a case every time the dressings are changed. The urine of 20 of the patients admitted to the Massachusetts General Hospital was analysed and the maximum excretion in twenty-four hours was 2·5 g. This level is far below the figures recorded in cases of boric acid poisoning and there was no evidence of poisoning in any patient treated.

INFANT WELL-BEING IN WAR-TIME

IN a statistical study, Lewis-Faning and Milligan[1] compare the rates of growth of infants in the prewar and war years. The scene of their activities was the town of Glossop in which data had been collected during 1933–36 from 307 infants attending the infant welfare clinics. For comparison they collected similar records of 482 infants attending the clinics between July, 1940, and July, 1942. In neither study was it possible, of course, to follow the growth of one group of children week by week through the first year of life. What became available was the average growth curve derived from the records of the children attending at any given week of age. It is these growth curves that are compared, after smoothing them to allow for the inaccuracies introduced by small numbers and the changing samples of infants at each week. By these means it is found that the average weight of the male baby between 2 and 52

1. *Amer. J. Surg.* 1943, **59**, 104.
2. *Proc. Mayo Clin.* 1943, **18**, 385.
3. *Ann. Surg.* 1943, **117**, 801. *J. Amer. med. Ass.* 1943, **123**, 1098.

1. Lewis-Faning, E. and Milligan, E. H. M. *Med. Off.* 1944, **71**, 13, 21, 29.

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ks old was rather greater in the war years than the var—16·25 lb. in 1933–36 and 16·42 in 1940–42, a erence which is more than is likely to be due to nce. In length the male infants showed no difference. female babies showed no material difference in rage weight (15·00 lb. prewar and 15·11 lb. in war rs) but a somewhat greater average length during war. When the two war years are taken separately, s found that the better weights in the war period irely depend on the figures for 1941–42, the previous r giving figures virtually identical with those for the war years. The explanation suggested is the shortage protein foods in the latter half of 1940 and early in 1 which was subsequently relieved under lend-lease. the early weeks of life the male babies in the war re on the average nearly half a pound lighter and a rd of an inch shorter than the prewar vintage. These ficiences were overcome by the 18th week of life and the end of the year they were a third of a pound avier and a sixth of an inch longer. Females showed appreciable difference in weight at any age but were nsistently rather longer in the war years. The ther lower level of the males at the start of life was rther examined by the collection of weights at birth, 0–'42 being compared with previous figures for '37–'39. o significant difference was apparent though again the ales, and not the females, were a little lighter in the ar period. The curious sex difference may be related the greater activity and higher basal metabolic rate the boys. The girls' requirements may be less nd met even in times of a relatively poor diet, so nat improvement in diet does not produce an improvement in growth. On the other hand, the boys' greater equirements are not met and they will respond to the etter dietary standards. The diet of the working-lass families in Glossop was indeed, according to the vailable data, improved in the war years, especially n its protein, calcium and vitamin content. That the nfant growth-rates—accepted as a sensitive index of rogress—have certainly not deteriorated and probably mproved is good reading. Studies in other areas would e of value.

"KAISER WAKES THE DOCTORS"

THE Kaiser in this story[1] is Henry J., miraculous builder of Liberty ships and giant aircraft. His mush-room shipyards on the Pacific Coast employ a motley collection of men and women aged 16 to 80, including the halt, the maimed and the partly blind. To cope with the influx of all these people into the neighbouring towns was beyond the powers of the local practitioners: "doctors' offices became miniature madhouses; appointments to see a doctor often had to be made weeks ahead of time; in hospitals there were frequently no beds available at all, not even for emergency operations." So Kaiser decided that his workers should have their own medical service, and invited Dr. Sidney R. Garfield to run it. Garfield believes in group medicine, and Kaiser believes that his employees should have the same kind of medicine as himself. It was not long therefore before Garfield had a string of first-aid stations serving a couple of first-class hospitals providing the shipyard worker, whatever his previous state of health, with virtually unlimited medical attention, including all necessary investigations and operations or other treatment—all in return for a regular deduction of half a dollar a week from his wages. "I've never in all my experience seen so much and such good care given for so little money" said a medical visitor. Under the Kaiser plan "science was lavishly on tap, with absolutely no hold-back because of its expense." Garfield's team of 60 young doctors, who were paid good salaries, enjoyed working under these conditions: they "knew well that this scientific lavishness was not really extravagant. They knew that widely prevailing inability of physicians to give this 'expensive' care is actually a nationwide false medical economy, devastating to our manpower, and profitable only to our morticians." Far from running into bankruptcy the Kaiser health scheme prospered exceedingly. Deriving 60% of its funds from workers' contributions and the other 40% from industrial insurance companies' payments for looking after workmen's compensation cases, it made such profits that within three months it began repaying its original loan of 250,000 dollars at the rate of 25,000 dollars a month. Faced with the prospect of large surplus funds, Kaiser and Garfield turned their service into a non-profit corporation, the Permanente Foundation.

The point of the tale and its title is that schemes of this kind have been consistently opposed by the high command of the American Medical Association, which believes that doctors should practise on a fee-for-service basis, making arrangements with individual patients but never becoming salaried servants of an organised group of contributors. Until prevented in 1942 by a judgment of the Supreme Court, the AMA was in the habit of expelling members who took salaried posts under group health schemes, and this made it difficult for them to practise. Kaiser was in a strong position to fight this policy: answering a critical leader in the *Journal* of the AMA he said "We are trying to build ships—we need well men and women to build them, and where hospital and medical facilities have not been available, we have created them. If Dr. Fishbein is against our doing that, then I am against him." The author of this book, Paul de Kruif, confesses that hitherto he had "remained content with official medical explanations that this prepaid medicine was *unethical*. . . . One hundred thousand doctors could not be wrong." In *Microbe Hunters*, *Men against Death*, and other vivid accounts of scientific progress, he had shown what medicine could now do, but had ignored the fact that, owing to the present economic organisation of practice, the benefits he described were often beyond the reach of those needing them. He now came to realise that the advances of medicine have raised its costs so high that, like the costs of domestic conflagrations, they cannot be borne unless the risk is spread by contributions during health. Under the old system, since the individual sick man must pay his doctor, it was inevitable that "doctors will go where sick folks have the dough. This had brought about a mal-distribution of medical care that stank to high heaven." Group medicine as provided by Garfield for Kaiser's workpeople was a revelation to him, as it has been to others. "Dr. Carl A. Johnson," for example, "was not what you would call a hare-brained do-gooder. His feet were on the ground. . . . But what most impressed our hard-boiled surgeon was the generosity of the health plan. 'This is putting the whole practice of medicine on the spot. Talk about wildcat medicine—contrary to ethics,' he exclaimed bitterly, 'This is the real Good Samaritan. Here you see the old Oath of Hippocrates—really in action.'"

Being an American industrialist, Kaiser is at one with medical leaders in their horror of tax-supported Government medicine. The plan which, through de Kruif, he puts before the public and profession is to establish, wherever there are industries, "Mayo Clinics for the common man." There is no trouble in getting workmen to spend the equivalent of half a packet of cigarettes a day (American prices) when they know this will guarantee them the best unlimited medical attention; and a group of doctors pooling their equipment avoid the enormous waste involved in practising individually. "It's the facilities that now dominate modern medicine," Dr. Ray Lyman Wilbur told Mr. Kaiser. "Grouping your staff under one hospital roof, you've compelled them to work around those facilities. Your doctors

1. Kaiser Wakes the Doctors. By Paul de Kruif. New York: Harcourt, Brace and Co. 1943. Pp. 158. $2.

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aren't working for the automobile company or the chauffeur or the real estate agent or to keep up to the social standing of the Joneses—they're working for the Kaiser workers." A local industrial service of this kind, in Kaiser's opinion, permits of full professional autonomy: "industry must be responsible for managing—with a voice in that management from the unions, from the workers who pay for their care, who really own it. But you, the doctors, have got to personnel it. You're the only ones who know how to staff it. You've got to set up the scientific standards, hold every doctor up to them. You'll have complete control of your personnel." As for finance, he proposes that local bankers should take half the risk of initial loans, while the Government guarantees the other half.

Social insurance has hitherto made far greater advances in Europe than in the United States, and we in this country may now hope for a comprehensive medical service that will provide for our entire community the advantages which the Kaiser plan would offer only to sections of the American public. Moreover we have not forgotten the objections to independent schemes of "pre-paid medical care" that necessitated the nationalisation of health insurance in 1911. Nevertheless de Kruif's account of the project, which is couched in his usual fascinating (or maddening) idiom, will interest British readers—not only as an appeal to the public against the AMA view but also by its insistence on practice by groups rather than individual doctors and its argument that the fullest service is the best for morale and ultimately the most economical. So that the dependants of his workpeople shall share in their advantages Kaiser has opened his hospitals to patients belonging to the California Physician's Service, which gives domiciliary care in return for weekly payments. This progressive body, though composed of private practitioners, engages salaried doctors to attend to minor ailments at health centres it has established on new housing estates. Its experience should be noted by those concerned at the shortage of medical man-power here:—

> "Under the prevailing system where the bulk of the population is taken care of by individual doctors in their offices, it has been estimated that one physician can hardly care for more than 1000 people. . . . But California Physician's Service—concentrating the treatment of minor illnesses at its Health Centers and referring more serious cases to doctors in their private practices—finds that one physician can take care of 2500 people fairly effectively. And when an ample staff of visiting nurses is added, this may now rise to a ratio of one doctor for 5000."

Full medical care is not a luxury, and practice by doctors in groups economises medical skill and resources.

BICUSPID AORTIC VALVES

THE old view that bicuspid aortic valves were usually congenital in origin and specially prone to subacute bacterial infection was supported by the work of Lewis and Grant[1]; in their estimate nearly a quarter of such congenitally deformed valves became infected in adult life. Later work by Gross[2] and by Koletsky and his colleagues[3] indicates however that bicuspid valves as a congenital deformity are relatively rare—most are produced by rheumatic fever and a few by degenerative lesions. Moreover, the affected valves are probably no more liable to bacterial infection than other sites of rheumatic endocarditis. In 1200 consecutive necropsies Koletsky and his colleagues found 12 cases of acquired bicupsid aortic valves in adults, and only 1 congenital case; and of 50 cases of the deformity in adults, found at necropsy, 40 were acquired and 10 congenital. Of the 50, 8 had superimposed bacterial endocarditis; while only one of the 8 had a congenital deformity, and in this case, as in the others, the valve had suffered previous rheumatic infection. The incidence of bacterial endocarditis in the acquired cases was 17% (7 out of 40 cases) and the general incidence among rheumatic hearts 12% (60 out of 475 cases). As Koletsky points out, the differences between these figures are too small to indicate clearly that the bicuspid deformity predisposes to bacterial disease. He suggests, too, that no congenital valvular defect should be held to have led to the onset of bacterial endocarditis until rheumatic disease has been excluded.

1. Lewis, T. and Grant, R. T. *Heart*, 1923, **10**, 21.
2. Gross, L. *Arch. Path.* 1937, **23**, 350.
3. Koletsky, S. *Arch. intern. Med.* 1941, **67**, 129, 157; *Amer. J. Path.* 1943, **19**, 395; *Amer. Heart J.* 1943, **26**, 343; Karsner, H. T. and Koletsky, S. *Trans. Ass. Amer. Phys.* 1940, **55**, 188.

NON-IONISING RADIATIONS

THE Medical Research Council have appointed the following as a committee to advise and assist them in promoting the quantitative study of the non-ionising radiations, particularly in relation to their medical applications: Prof. H. Hartridge, MD, FRS (chairman); Dr. Philippe Bauwens; Dr. R. B. Bourdillon; Mr. E. Rock Carling, FRCS; Prof. J. A. Carroll; Mr. J. Guild (nominated by the Department of Scientific and Industrial Research); Prof. F. L. Hopwood; and Prof. W. V. Mayneord (secretary). In 1928 and 1937 satisfactory units for the measurement of ionising radiations were agreed internationally, and there is urgent need of a corresponding standardisation for the non-ionising radiations. Under this heading will be included infra-red, visible and short-wave wireless radiations, but it may be found advisable to deal also with ultraviolet and ultrasonic radiations, since none of these was covered by the earlier recommendations.

A SIGN OF RAISED VENOUS PRESSURE

THE normal pressure in the veins is 2–6 inches, or 50–150 mm., of water, and A. M. May (*Amer. Heart J.* 1943, **26**, 685) points out that in the average adult the veins on the under surface of the tongue are 8 in., or 200 mm., above the right auricle. In the standing or sitting position, therefore, these veins are collapsed unless the venous pressure is raised. May claims that this is not only a simple but a reliable guide, and his claim should be easy to confirm or refute.

SHADOW OF COMING EVENTS

ON the eve of the white-paper's appearance there was a notable all-party gathering in the Great Hall of Lincoln's Inn. The occasion, which was created by Sir Buckston Browne's kindly thought to bring fellows and members of the RCS into friendly contact, became a meeting—quiet, intimate and unhurried—between Ministers of State (health, labour, reconstruction), presidents of all three Royal Colleges, other high officials, and consultants and practitioners in many walks of medicine. Sir Alfred Webb-Johnson, taking as read the annual report of his own college, succeeded with many droll and kindly thrusts in drawing a convincing picture of a free and independent profession serving the health of the nation. We know, he said, the value to the community of free professions. For a generation it had been pressing for a comprehensive service for those who needed it. "Free as I am from all," he might have been saying for the medical profession, "I have made myself the servant of all." Mr. Willink, responding for all the guests, spoke with a consciousness of the tradition of the profession whose hospitable Inn they were enjoying. He took his hearers back to chapter XL of Magna Carta: "to no one will we refuse or delay, right or justice"—or the means of health.

AN extra session of the General Medical Council will open on Tuesday, Feb. 29, at 10 AM.

The KBE has been awarded to Major-General E. M. COWELL, CB, CBE, DSO, FRCS, in recognition of gallant and distinguished services in the field.

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Special Articles

TWO INQUIRIES INTO HIGH INFANT MORTALITY

I. Scotland

THE disturbing level of Scotland's infant-mortality rate—the highest of seventeen countries, including the Dominions, the USA, and all the countries of Western Europe except Spain and Portugal—led to a request by the Secretary of State for a searching investigation into its causes. Accordingly a subcommittee, under the chairmanship of Sir John Boyd Orr, was appointed by the Scientific Advisory Committee of the Department of Health for Scotland

> To consider the high infantile mortality experience in Scotland with a view to estimating its principal causal factors and suggesting lines of action to ensure its reduction,

and their report [1] was issued at the end of 1943.

The Committee felt it necessary, in order to get a true picture of the loss of infant life, to include stillbirths. Since these have only been notifiable in Scotland since 1939, the statistics from 1939–41 have been used; in all other parts of the report attention has been confined to prewar conditions (1934–38).) The problem has been dealt with in two parts—deaths under one month (neonatal mortality) and deaths between one and twelve months. In order to bear comparison with New Zealand or Holland, Scotland would need to reduce neonatal mortality by 30% and mortality in the rest of the first year by 75%, thus saving 3640 lives a year. By bringing stillbirths to the level in Holland a further 1570 lives would be preserved, a total saving of 5210.

The Committee finds that the main causes of excessive neonatal mortality are prematurity and congenital debility—that is to say, antenatal conditions largely connected with the state of the mother during pregnancy. Prematurity undoubtedly accounts for a considerable proportion of neonatal deaths, and it is significant that the incidence of prematurity is nearly twice as high in the poorer as in the better-off families. Excess of stillbirths in Scotland is as great as excess of neonatal deaths, and associated with similar occupational and social causes. About two-thirds are attributed to antenatal conditions, the other third to hazards of birth. Many of the deaths in the latter group, it is said, could have been avoided if the women had been sent to hospital earlier, suggesting that better antenatal and obstetric care could reduce the number of stillbirths.

The even more marked excess of deaths between one and twelve months is stated to be chiefly due to infectious diseases, the ravages of which are greatly increased by adverse environmental conditions, mainly poverty, faulty feeding and poor housing.

> "In Scotland, as compared with England and Wales, the percentage of unemployment is higher, the proportion of people living in poverty twice as high, and the percentage of overcrowding six times as great."

Urban and rural districts are alike affected. The predominantly rural areas of South-west and North-east Scotland are at least as bad as the mining villages and small industrial towns of the Lowlands, though infant mortality in parts of the Highlands and Islands is low, especially in the 1–12 month group.

Correlation between overcrowding and infant mortality is obvious. Average overcrowding of families is 26·2%, the standard permitted being two persons to a room, a child between 1 and 10 years being counted as half a person, and an infant not counting as a person at all. This is not an unduly high standard, and moreover it does not cover the massing of humanity in tenements characteristic of Scottish slums. The report says:

> "The most crowded houses will also usually be the oldest and most dilapidated, with decaying woodwork and pest infested, sometimes without water-closet, indoor water-supply or even the most meagre larder accommodation."

Small wonder that infection takes a high toll of infant life in homes where isolation cannot even be attempted, and where babies are subjected to repeated mass infections of the most varied type.

Unemployment is an aggravation of poverty: on the one hand it tends to reduce wage rates, and on the other it leads to a state of economic insecurity which must militate against the careful rearing of children. Birth-rate among the Scottish poor is high, and children are in themselves a source of poverty since wages are not adjusted to the size of the family. Early breeding and large families do not apparently have much effect on neonatal mortality, but close spacing grievously prejudices the expectation of life in the later period of infancy. When a new baby is started before the first is a year old, the chances of death of the first baby are multiplied by three. Yet the experience of Holland, New Zealand and some other countries proves conclusively that a high birth-rate is not necessarily associated with high infant mortality.

The diet of poor mothers is frequently characterised by low energy value, low protein content, and deficiency of calcium, iron, vitamins A and C and riboflavin—just the type of underfeeding to result in poor lactation. An anæmic and undernourished woman is not likely to have the vitality and vigour called for in rearing a healthy family, while a baby born of a debilitated mother will almost certainly start life without reserves, if not with a deficiency of calcium in the skeleton. Breast-feeding is handicapped from the start, and many who initiate lactation fail to maintain it for more than a few weeks. The difficulty of successful bottle-feeding in crowded and dilapidated homes is evident, and a large number of Scottish infants begin life under disadvantages caused both by antenatal conditions and by the physical environment into which they are born. The Committee expresses the opinion that there is only one correct treatment for pregnant women suffering from multiple deficiencies, and that is an adequate and well-balanced diet. Breast-milk is of particular importance to the premature infant, but Scotland has no organised breast-milk service.

Medical and child welfare services in Scotland are not up to the standard of those in England and Wales. There is a serious shortage of maternity beds, and clinics are often held in poor, ill-equipped and overcrowded premises. Teaching of medical students in principles of child health and nutrition is inadequate, and there are neither sufficient teachers nor suitable teaching units. Training of midwives and maternity nurses is not in accord with the rules of the Central Midwives Board. Health visitors in many cases have larger districts than they can attend to efficiently, and local authorities do not take full advantage of their powers to supply extra food and domestic help.

First among the Committee's recommendations for safeguarding infant life is improvement in housing, without which, they say, no other measure is likely to have its full effect. Second comes insistence on the provision of food, satisfactory both in quality and quantity, for mothers and children. Extension of welfare services is urged, especially on the educational side, including better training of the health visitor and bringing the number of homes for which she is responsible within reasonable limits. The report says that the medical staff of the child welfare service should be more highly trained, especially in principles of child health and nutrition, and it is suggested that such doctors should be available for home visiting. Antenatal clinics should be an essential part of the obstetric service and staffed by obstetricians. There is urgent need of an increase in maternity hospitals, well planned and sufficient to accommodate all primigravidæ and other women with bad obstetrical histories or from unsuitable homes. The report suggests the provision of 45 beds per 1000 total births as a first minimum.

II. Northern Ireland

A similar but smaller inquiry has recently been carried out by two investigators in Northern Ireland, at the instance of a voluntary society interested in social medicine,[2] with a view to discovering some explanation

1. HMSO, pp. 84, 1*s.* 3*d.* See *Lancet*, Jan. 1, p. 25.

2. Infant Mortality in the City of Belfast, by James Deeny, MD, FRCPI, and Eric T. Murdock, PH D, a paper read to the Statistical and Social Inquiry Society of Ireland on Dec. 17, 1943, and summarised in the *Ulster Medical Journal*, November, 1943.

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and remedy for an infant-mortality rate in the city of Belfast varying between 85 and 120. A personal anonymous and private survey was undertaken, covering 554 cases, being 84% of legitimate infant deaths in the city between June, 1941, and June, 1942. Later a group of 477 living children were included as controls. One investigator visited the homes of the children and collected evidence as to size of family, including previous infant deaths, income, housing, domestic hygiene, care and feeding of the child, antenatal and obstetric attention, medical, nursing, hospital and other features relating to the fatal illness. Forty per cent. of the deaths occurred in the first month of life, with a steady decline thereafter as age increased.

The inquiry showed that certain dispensary areas in Belfast have an unduly high infant-mortality rate, different areas varying between 119 and 41. The difference was definitely related to income level and overcrowding, housing density being regarded as the overriding social factor related to mortality. The main causes of death were found to be respiratory infections, gastro-enteritis and prematurity. Diarrhœa and enteritis were most prevalent among the poorest, prematurity and congenital malformations among the richest. Respiratory and digestive diseases have a low incidence in the control group, over 73% being completely free from both forms of illness, and only 2% of those attacked requiring admission to hospital. Moreover, in the control children these diseases mostly occur at teething time, and doctors are not called in so early as in the mortality group. Serious illness of these two types therefore appears to affect almost exclusively a small group of children.

The investigators say that, while it is not possible from the analysis to forecast the type of child likely to die, some definite points emerge: deaths are mainly confined to certain districts; children who die are in the lower income groups; they exist in smaller and more crowded houses, and they are not so well breast-fed. There is a considerable difference in breast-feeding in the two groups, a smaller proportion being breast-fed and for a shorter time in the mortality than in the control group.

Poverty did not prevent parents from obtaining medical advice, which was summoned on the first or second day of the fatal illness in 80% of cases, the family doctor being the attendant in more than half. In eight cases no doctor was sent for, and in 27 the child was dead before his arrival. Medical attendance was considered to have been satisfactory in 68% of the cases reviewed. A serious lack however was a complete absence of proper nursing in no less than 79% of all those cared for at home.

The practical suggestion is put forward that an organised service of trained nurses to look after serious cases of illness in the homes should be instituted to work in the limited areas where these types of sickness in infancy are prevalent. Such a service would require coöperation on the part of the mothers and of the general practitioners. It is pointed out that the diseases mainly responsible for the loss of life are to a large extent preventable, and the investigators, while agreeing with those who say that poverty and its resulting bad environment are the real factors underlying infant mortality, qualify the statement by a consideration of man's ability to change his environment for the better.

PSYCHIATRIC DISABLEMENT

"Someone said recently in the House of Commons that 'the greatness of a nation is its fit men.' But I say the soul of a nation is expressed in its attitude to the handicapped."

Mr. GEORGE TOMLINSON, MP, speaking at the annual meeting of the Ex-Service Welfare Society on Feb. 9, was emphatic that there was no justifiable distinction between mental and physical ill health. Yet stigma still attaches, he feels, to the patient treated in a mental hospital; and this because we have served our mental hospitals so badly in the past, keeping them short of funds, and allowing them to acquire a dreadful reputation which humanity and science have not yet succeeded in shaking.

Because of the prejudice against them a man boarded out of the Services for psychiatric illness may waste several months at home receiving inadequate treatment, when perhaps he is a suitable candidate for one of the newer forms of shock therapy. Dr. ROLF STRÖM-OLSEN suggested that Service men discharged for neurosis should be informed of facilities for treatment near their home; and Dr. T. P. REES felt it should be possible to discharge them straight to their own mental hospitals, where the social worker can investigate the home conditions and later take the man to the labour exchange and get him fixed up with a job. Mr. TOMLINSON agreed that the man would get the most skilled treatment at a mental hospital but felt, all the same, that he should only be sent there as a last resort. "If the skill is in the mental hospitals then it's in the wrong place." He feels that the public will have to acquire a completely different attitude to mental illness and its treatment before this stigma disappears.

The return of the neurotic or psychotic to industry presents special difficulties of its own. As Dr. AUBREY LEWIS pointed out, there is prejudice against these patients, dividing them from the physically disabled, for whom there is universal sympathy.

With Lord HORDER presiding in the morning and Prof. J. LE FLEMING BURROW in the afternoon, the society met to discuss whether the Government provisions for treatment and training facilities satisfied the requirements of the medical profession; to suggest developments within the society to fit in with those provisions; to indicate how coöperative understanding between hospitals, Government, and employers might be achieved; and to consider the therapeutic effects of pensions on patients with nervous disorders attributable to Service experience. These topics were not considered separately; talk ranged freely over them.

THE NEUROTIC AND THE LABOUR MARKET

Colonel THOMAS TENNENT spoke of the good results achieved by the society's colony at Leatherhead, where many men who had done no regular work for as much as 9 years, when first admitted, could now look back on 17 years in steady employment. They are able to earn £3 15*s.* a week and overtime by making electrically heated blankets, and many of them have pensions in addition to this. Married men live in cottages built by the society, paying a rent of 11*s.* 6*d.* a week; the others live in a hostel. Some 200 of them have passed out of the colony to resume work in the outside world. Those who remain are not likely to move on and leave places for others—one of the difficulties always attaching to sheltered workshops. Dr. J. F. E. PRIDEAUX described contrasting experience in a Ministry of Pensions colony where discontent and alcoholism among the men interfered with the proportion of successes. Dr. ELIOT SLATER thought these different experiences were explained by the different approach to the patient by the society and the ministry. Patients, he suggests, are fundamentally suspicious of a Government department, but not of a voluntary body. Red tape interferes with the smooth running of an official colony, whereas the psychiatrist of a voluntary organisation takes responsibility for his own actions.

Dr. LEWIS said that conditions at Leatherhead had been adapted to the industrial circumstances of the country at the time. An article was chosen for manufacture which is not made elsewhere in the country, and thus the colony has had an exclusive market. He noted that men, judged by competent psychiatrists, before the war, to be unemployable, have been found, on recent follow-up, to be at work and keeping themselves. Dr. PRIDEAUX confirmed this from the experience of his department; at the beginning of the war a group of men for whom permanent work under sheltered conditions had been thought necessary had been sent home on pensions: and had been absorbed into industry.

Dr. LEWIS thinks it undesirable to set aside any particular industry or group of industries as suitable for neurotics, since it would tend to separate them in the public mind from other disabled people. Neurosis is a temporary, not a permanent, illness; and the public must be taught that neurotic patients will respond to tolerant but sensible consideration in their work. They need adequate psychiatric supervision; and since we have too few psychiatrists he thinks we should do what we can to spread them smoothly about the country.

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tors are needed inside and outside industry, and uld keep in close touch with employees' organisations. ugh in his opinion psychiatrists are not called upon evise or insist on any given scheme, they should be sulted when schemes are being planned and asked to re in running them.

he view that the neurotic and the recovered psychotic uld be put to work in normal circumstances as soon possible was supported by Dr. E. D. MOIR. Sheltered kshops are too often sick-bays, he thinks; and the to the management of these men in normal industry unobtrusive supervision by the works doctor. The eral practitioner, the psychiatrist and the industrial dical officer must draw closer together; he would like see the industrial medical officer oftener in the hospital, d the general practitioner and the psychiatrist oftener the factory and the shipyard. More general practiners could hold part-time industrial jobs; and they ould encourage their patients along the path to reovery. Neurotics and psychotics need every incentive use their leisure wisely, and here social workers can ay an increasing part. The fit men in a factory are aware that a neurotic employee has ever been unfit, d will accept him in whatever department he is placed.

EFFECTS OF HOME AND HOUSE

Home conditions can handicap a man's progress; r. Moir recalled the remark of a psychiatrist: "I ould discharge half my patients if their home conditions ere satisfactory." Dr. LOUIS MINSKI spoke of the man nt home from active service with a psychiatric disbility who finds his home or his business bombed, his ife gone, or another man's child added to the family. ne man who had risen to the rank of company sergeantajor came back to find his bombed-out family living a Poplar cellar; his wife had slipped into the pattern f a lower social grade, and his children were out of hand. o compensate for this additional emotional shock he eeded two months longer in hospital. The housing hortage was thus held to be contributing to the length nd severity of psychiatric illness.

A CLOSER TOUCH

Speaking of better coöperation between those concerned to get the man back to work, and settled in it, Brigadier J. R. REES mentioned the broadening effect of life in the Army on psychiatrists. When they had tinkered with tanks and jumped from aeroplanes they had a better idea of the sort of work they were directing recovered patients to undertake; and their suggestions became correspondingly more sensible. Dr. E. B. STRAUSS thought they would be better employed helping at the short-handed civilian outpatient departments one day a week. Colonel A. A. W. PETRIE had found labour exchanges coöperative in the main in placing men in jobs, but thought they sometimes lacked resource when a job had proved unsuitable and the man would like a change. He had specially in mind the case of a depressive, further damped by being appointed gravedigger. Mr. TOMLINSON, who clearly attaches great importance to direct personal contact, suggested that, though it was not their job, psychiatrists might do much to educate labour exchange officials by going round and having a talk to them. They have had a bewildering time, he reminded the society; for years before the war they had to deal with men for whom there were no jobs, and they inevitably came to think of the disabled man as a nuisance. Now they are suddenly expected to fit themselves to a new situation. "They'll take a lot of convincing there are better jobs than digging holes."

PENSIONS AND CURE

The general feeling of the meeting was that pensions are not to be recommended for psychiatric casualties except in special cases. Brigadier REES held that to give a neurotic man a pension was to make him more, not less, dependent; and made it harder to get him to take the next step towards independence. As Colonel PETRIE put it, when the penalty for getting out of his bath-chair is £2 a week the patient daren't recover.

Discussing attributability, Dr. NOEL HARRIS said that if a man in civilian life had adapted himself successfully and never been off work for mental illness, then there was a reasonable case for giving him a pension if he broke down under Service conditions; but if he had always had a feeble personality which had broken down at intervals it was not fair to burden the state with his support in the form of a Service pension. Dr. PRIDEAUX said that men with no previous history of instability usually recovered from war neuroses in any case; 87% of the men pensioned in this category in the last war had been taken off pension by 1923. They had recovered, in spite of treatment and pension. But Dr. SLATER was not satisfied: the Ministry of Pensions, he felt, was concerned with justice rather than treatment. It said "This man has a disability and he has had a bad time: is the disability related to the bad time? If so he is pensionable." It did not consider the effect on the man. Yet a pension is a therapeutic instrument for good or ill.

"I've heard pensions called a good many things" Mr. TOMLINSON remarked, "but never a therapeutic instrument before." He suggested that we cannot afford to indulge in fancy words. We must explain clearly to the public and the patient what we mean. The new Act seeks to give the disabled man a measure of economic security, and perhaps we have not yet the experience to know how it will work for psychoneurotics. Leatherhead shows what can be done. Colonel PETRIE pointed out that much must depend on the contents of the forthcoming white-paper. Assuming some parts of the Beveridge scheme are implemented, it will become easier to fit psychiatric patients into society. One of their difficulties in the past has been to make a living in a world where the weakest goes to the wall.

Dr. WILLIAM SARGANT suggested that the society could best contribute to public experience by starting its own clinic for treatment of psychiatric cases. Insulin and convulsion therapy have both reduced the need for rehabilitation. A well-run clinic could show the benefits of balanced treatment in preventing prolonged disability.

PENICILLIN

"To correct a great deal of inaccurate information which appears to be current on the subject" the following statement on penicillin has been issued by the Therapeutic Research Corporation of Great Britain, Ltd.:

Recent Parliamentary questions regarding penicillin suggest that the time has arrived for the companies engaged in the development of penicillin production to direct attention to certain facts.

The discovery of penicillin and its development for therapeutic use were both due to British scientists—the first to Professor Fleming and the second to Professor Florey and his collaborators at Oxford. Up to the present, however, penicillin can only be manufactured by biological, as distinct from chemical, methods, and procedures are highly technical and complicated. Penicillin itself is of an unstable nature. Thus, although its manufacture both in Great Britain and America is now developing on a commercial scale, there is as yet no absolute certainty that each batch will be of the same standard activity.

Professor Florey's results stimulated research work by a number of scientific workers in both the industrial and academic fields. Indeed the research leading up to the large-scale production of penicillin may well be claimed as an instance of collaboration without parallel in the pharmaceutical industry. For example, the Therapeutic Research Corporation of Great Britain (which was formed in 1941) had already established a pooling of research effort between Boots Pure Drug Company, Ltd., the British Drug Houses, Ltd., May and Baker, Ltd., Glaxo Laboratories Ltd., and the Wellcome Foundation, Ltd., Imperial Chemical (Pharmaceuticals), Ltd., who had been researching into these problems, and Kemball, Bishop and Co., Ltd., who had long experience in the manufacture of products by mould fermentation, completed the industrial pool of skill and experience directed towards the problem of the manufacture in Great Britain of penicillin in quantities adequate eventually for the nation's need. Meanwhile, other eminent academic workers, notably Sir Robert Robinson, Professor Heilbron, and Professor Raistrick, with their associates, have collaborated in full measure.

Subsequently, the Medical Research Council in this country and the Committee on Medical Research in the United States arranged for the regular exchange of information between teams of workers in the universities and industrial laboratories and other institutions on both sides of the Atlantic.

Finally, the activities of the institutions and undertakings concerned are coördinated with the various interested Minis-

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tries and Service departments in the General Penicillin Committee of the Ministry of Supply. Anything less like a monopoly has never been seen. There is full mobilization of the appropriate skill and talent possessed by both Britain and the United States for speeding the solution of the problem of manufacture of the supplies of penicillin which are vitally needed.

Mr. David Robertson, MP, whose questions in the House of Commons were reported on p. 229 of our last issue, has replied as follows :—

The information now given publicly confirms the suggestion which I made that a virtual monopoly had been given to three or four companies. In war-time large and permanent new buildings are being erected for at least two of the companies adjacent to their existing premises. They are not completed and will not produce penicillin in time for the second front. They should be profitable assets for their owners or occupiers after the war, but the "died of wounds" casualty lists will have been published before then. If existing buildings had been requisitioned, the penicillin we so urgently require would have been available now in large quantities. I believe the only company producing penicillin in quantities is doing it in a requisitioned building. Millions of cubic feet are used for storage and other purposes, but their retention is deemed of greater importance than the production of penicillin. British production of penicillin is quite inadequate for our essential military needs. American production is far in excess of ours. Their military needs have already been met, but they have not granted any monopolies. Many more firms are manufacturing penicillin in the United States and Canada than in this country.

Further parliamentary questions and answers will be found on p. 262.

FOOD AND FARMING

THE Fabian conference on food and agriculture opened on Feb. 12, with Miss Ellen Wilkinson, MP, in the chair. Sir John Orr, MD, FRS, said that the provision of food and shelter on a health standard for every family in the world would save more man-years of life in one generation than have been lost in all the wars in modern history. It would add at least 5 years to the expectation of life in children born in England and 10 years to those born in Scotland, and double the average length of life in those born in countries where food and shelter are worst. Housing, he said, is a national problem; food is an international problem. The United Nations Food Conference, at which 44 nations were represented, declared: (1) that the kind of food needed for health is known; (2) that in the best-fed countries 20–30% of people, in the poorest countries nearly all, lack enough of the right kind of food; (3) that lack of food is the cause of misery and untimely death; and (4) that the first cause of lack of food is poverty. They recommended that every government should be responsible for seeing that all its citizens can get sufficient food, that all nations should coöperate with each other to free all men from want of food, and that a permanent food and agricultural organisation, with representatives of all nations, should be set up. This food plan, based on human need, should banish hunger and malnutrition from the world, bring prosperity to agriculture, put food producers on a sellers' market, and expand both internal and external trade.

On Feb. 13 Sir John Russell, speaking on the overseas repercussions of British food policy, said that England and Wales have about 25 million acres of cultivated land, and 37 million acres of land all told, to serve 41½ million people. A high-nutrition diet can hardly be produced on less than 1½ acres per head, so it is unlikely that we can produce all our food at home. It would be wise, he thinks, to concentrate on milk, meat, eggs, fruit and vegetables, which will employ a larger number of men on the land than simple corn-growing would do. We shall probably import much of the corn needed for ourselves and for animals. Oil-seed is needed in industry, and grain is used by the fermentation industries; farmers use the residues. We shall also probably import most of our butter, because it is less lucrative than milk. Probably about half of our meat will be imported. Bananas, oranges and apples before the war were our favourite fruits; of these, only autumn and winter apples can be grown here—the rest must be imported. After the war, then, we may expect to trade freely with the Dominions and South America for grain, meat and butter; with the United States for fruit and grain; with Western Europe for dairy produce, fruit and early vegetables; and with Poland for live-stock products. He thinks it unlikely that the pattern of our overseas food-supplies would greatly change under a high nutrition policy, but we can expect a shift towards those commodities not easily produced at home.

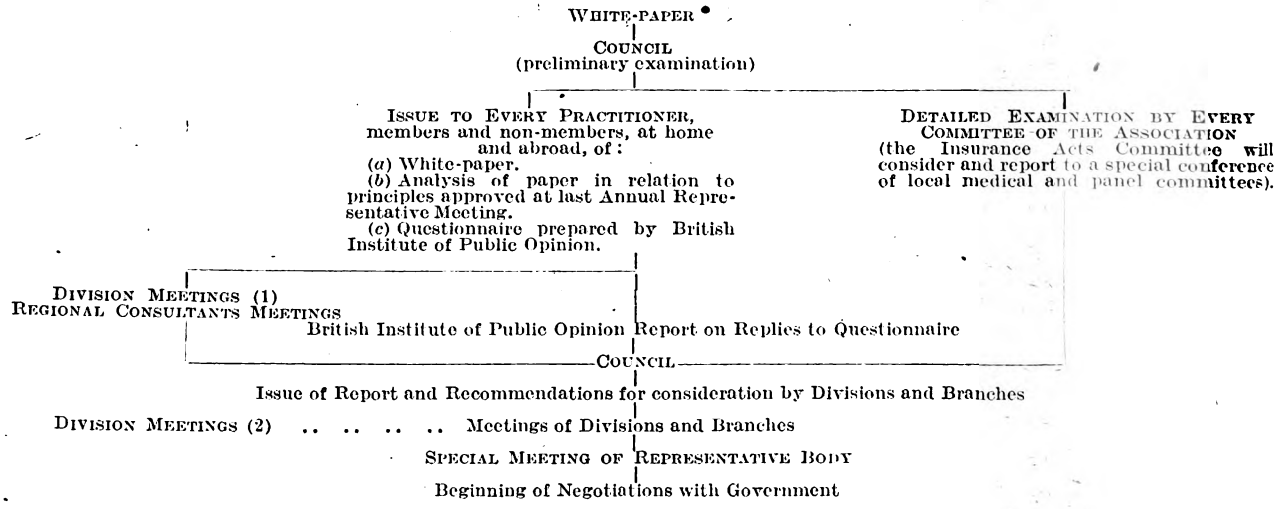
BMA AND WHITE PAPER

AFTER the publication of the Government's white-paper on a comprehensive medical service, the British Medical Association will ascertain the views of the profession before holding the special representative meeting at which it will reach its own decisions. The procedure to be followed is summarised below.

The meetings of Divisions (1), which will be open to the whole profession, will be for the purpose of an examination of general reactions to the paper, though they will not reach decisions or pass resolutions. Those steps will be taken at the second group of meetings. It is hoped that individual practitioners, who will have received the questionnaire, will thus have the advantage of participation in general discussions with their colleagues before filling in and returning their forms.

The meetings of Divisions (2) will have before them the council's report—and, it is hoped, the results of the independent inquiry—and will proceed to examine the council's report, to formulate their views, and instruct their representatives to the Representative Body. Similarly panel committees will examine the report of the Insurance Acts Committee and instruct their representative to a special conference.

No negotiations will begin until after the Representative Meeting.


WHITE-PAPER
COUNCIL
(preliminary examination)
ISSUE TO EVERY PRACTITIONER, members and non-members, at home and abroad, of:
(a) White-paper.
(b) Analysis of paper in relation to principles approved at last Annual Representative Meeting.
(c) Questionnaire prepared by British Institute of Public Opinion.
DETAILED EXAMINATION BY EVERY COMMITTEE OF THE ASSOCIATION (the Insurance Acts Committee will consider and report to a special conference of local medical and panel committees).
DIVISION MEETINGS (1)
REGIONAL CONSULTANTS MEETINGS
British Institute of Public Opinion Report on Replies to Questionnaire
COUNCIL
Issue of Report and Recommendations for consideration by Divisions and Branches
DIVISION MEETINGS (2) .. .. Meetings of Divisions and Branches
SPECIAL MEETING OF REPRESENTATIVE BODY
Beginning of Negotiations with Government

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Reconstruction

THE PECKHAM EXPERIMENT

HE Psalmist says that JHVH has set the solitary in ilies and at the Peckham Health Centre sundry lists have applied the divine principle to the pursuit ealth. With what success cannot yet be told, for worship of Hygeia has had a set-back while Mars is he ascendant and there is a pause in this "study of *living* structure of society," as the promoters call it, which to examine its validity. For if it is valid we y have to reconsider also the design of the buildings the practice of group medicine after the war—what been called the physiological anatomy of health tres.[1]

The experiment[2] began in 1926 when a small lay up, all under 30, under scientific guidance, took a all house in Queen's Road, Peckham, and invited nilies living nearby to join the "health centre" or amily club" for a small weekly subscription. By e end of three years, when 112 families (400 persons) d presented themselves for periodic health overhaul, was discovered that in those who manifested no sorder the standard of health or vitality, admittedly w, could not be raised without suitable equipment for e purpose. The pioneer centre was accordingly closed til in 1935 it came to life again as a field experiment at centre offering consultative services (as before) to a aximum of 2000 families, but now providing them in ldition with equipment for the exercise of capacities r which there was little or no outlet in their daily utine.[3] After eighteen months' work two conclusions ere reached. First, that the populace was made up of ree categories, those in whom (1) disorder was accomanied by disease, 32%; (2) disorder was so masked by ompensation as to give them the appearance of well-eing, 59%; (3) neither disease, disorder, nor disability ere detected—i.e., the healthy, 9%. Secondly, that technique for the practice of health was coming o light. In Sept., 1939, the centre's activities were uspended.

The building, now like a deserted hive, stands 00 ft. from the pavement of a quiet street and consists essentially of three great concrete platforms, surrounding a swimming bath, 35 × 75 ft. Most of the outer walls, as well as the wall of the bath, are of glass and even these fold back in summer to form open balconies, one above the other, to catch the afternoon sunlight. One side of the top floor is the consultative block, with its consulting, reception and changing rooms; and the biochemical laboratory. All the rest is freely at the disposal of club members: above, library, work-room, quiet occupation, games; below, gymnasium, theatre, nurseries; between, the cafeteria and large hall. "The general visibility and continuity of floors throughout the building is a necessity for the . . . human biologist. His new 'lens' is the transparency of all boundaries within his field of experiment." This was the lay-out and all the activities taking place in the centre were added one by one as the desire for them arose out of the association of the families gathered there. The activities, cultural and corrective, that came to be covered are briefly as follows:

WELFARE AND EDUCATIONAL

- Antenatal Clinic
- Postnatal Clinic
- Birth Control Clinic
- Infant Welfare Clinic
- Care of the Toddler
- Nursery School
- Immunisation Centre
- Medical Inspections of the Schoolchild
- Vocational Guidance
- Sex Instruction of Adolescents
- Girls and Boys Clubs
- Youth Centres
- Sports Clubs and Recreational Clubs
- "Keep Fit" and Gymnastic Classes
- Adult Cultural Education: (Music, debates, drama, any classes or lectures desired by the members)
- Citizens Advice Bureau
- Holiday Organisations
- Outings and Expeditions
- The Public House
- The Billiard Hall
- The Dance Hall
- Social Gatherings

THERAPEUTIC

- Marriage Advisory Bureau
- Mothers Clinic (diagnosis only in the centre, with personal reference to source of therapy)
- Guild Guidance Clinic
- School Care Committee Work
- Poor Man's Lawyer
- Hospital Almoning
- Hospital Follow-up (including aftercare for members discharged from medical care)
- Rehabilitation Clinic

The liveliest picture of the experiment can perhaps be best given by a series of eleven flashes, being verbatim extracts from the book.

The Aim.—"The Peckham Experiment has evolved a *Health* Centre, so far as we are aware the only one in the world. It is not that assemblage of Clinics conveniently congregated for the carrying out of medical desiderata, such as early diagnosis, minor therapy, prevention of disease, etc., which it is becoming fashionable to call a 'Health' Centre. It is a locus in society from which the cultivation of the family—living cell or *unit* of society—can proceed, and from which the family, sustained in its own growth and development, can spontaneously evolve as part of a larger whole—a live organismal society."

The Search.—"The student at this point must be willing to put from him the comfortable cloister of the traditional laboratory where he has learnt the structure and the classification of species; he must leave the protected harbours of the physiologist where the merest zephyrs of the environment are steadied and controlled; he must part company too with the student of medicine who, informed by the science of suffering (pathology), has been searching for negative evidence of function (health) in the shadow of sickness and amidst the shades of the dying. Leaving these behind him, now as biologist prepared to sail upon the open sea of humanity where the manifold winds of the environment play in ceaseless change, he may set out on a further search into the science of Living."

The Approach.—". . . how can such an unfamiliar and objective factor as a scientist and observer be introduced into any social milieu without instantly shattering its spontaneity? The answer seems to lie in the possibility that the scientist himself and his technicians should become one of the accepted groups forming the cultural diversity in the environment. . . . This clears away at the outset many difficulties of approach which beset other workers on human material. . . ."

Training of Staff.—"It is in fact no easy thing for the individual as a scientist to place himself as an instrument of knowledge completely at the disposal of any and every member, and at the same time, without exercising authority, to assume his right and proper position in the community as a social entity. But he is also there to make observations. This the members have readily come to accept, jokingly describing themselves as the biologist's 'rats.'"

Confidence.—"That all the examinations and consultations, following the traditions of clinical medicine, are kept strictly personal and confidential and are carried on without any sense of hurry goes without saying. Trouble is taken from the first moment of joining to engender between staff and members all the amenities of social contact, and by prompt and careful attention to all details to make it clear that the Centre is there primarily for the use of the members."

Consultation as a Solvent.—"Our point here is that by examination of the whole family we gained a knowledge of the direction in which disorder was likely to occur in the event of long-continued habit, or in the event of any continued or unusual strain. The circumstances of the Centre made—not drugs—but knowledge available to this family, and so placed them in a position to forestall what was at least a dangerous habit for them."

Social Contacts.—"A very high proportion of the families we have encountered are characterised by the absence of social contacts of any sort save those of the relatives of husband or wife—and these last are generally too close and too insistent to operate as anything but a restricting factor. One of the outstanding features of the populace from which our members are drawn is their inability through this lack of social excursion to take advantage of any new situation that presents itself."

Nidation.—". . . in seeking the *health* of the populace, the *first essential* for the cultivator (biologist) is to see that adequate opportunity shall exist for the easy and natural process of nidation of the young couple in a society which

1. *Lancet*, 1943, ii, 612.
2. The Peckham Experiment: a study in the living structure of society. Innes H. Pearse, MD; Lucy H. Crocker, BSC. Published for the Sir Halley Stewart Trust by Geo. Allen and Unwin Ltd? (pp. 333. 12*s*. 6*d*.)
3. See Pearse, I. H. and Williamson, G. S. The Case for Action, London, 1931.

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will offer them scope for their subsequent growth and development."

School or Work.—"... we have been very impressed with the difference ... in the physique and balance of development of boys who go to work at 14 as compared with those who remain at school until they are 16, 17 or 18. In the former there is an all-round robust functional development, often in spite of adverse industrial conditions, while those who continue at school seem overgrown—rather like an etiolated shoot—as though their development were distorted as a result of the sequestered atmosphere of school."

The Attendance.—"... many factors other than walking distance operate to make membership possible or impossible; for instance, the presence of busy traffic routes across the path to the Centre may make it dangerous for children to come unaccompanied; the location of the shopping area in the opposite direction may make it difficult for a mother to visit both it and the Centre in the one day. The position of the school or of the station used by the workers, the tram or bus route—trivial though they seem—all operate to determine the frequency with which the building can be used by a family, and hence the duration of their membership."

Last Word.—"So in the midst of social disintegration here there is beginning to appear a nucleus of Society the structure of which is neither 'planned' nor 're-constructed' but *living;* that is to say growing, developing, differentiating, as the result of the mutual synthesis of its component cells—its *homes.*"

Whatever the future of this particular jeu d'esprit it seems clear that the British Home Front will not be disbanded without leaving some tangible object of the comradeship and community spirit which has grown up in these changing years. *National News-Letter* (No. 394, Jan. 27, 1944) contains evidence of a widespread demand for some service or organisation which would combine physical and intellectual activities on a community basis, and, above all, would contribute to a higher standard of democratic citizenship. The civic centre envisaged by many would aim at becoming a sort of community club, with facilities such as reading-rooms and library, restaurant, swimming-bath and accommodation for games, theatre for lectures as well as drama and music. Some suggested that the centre would be the place to organise studies of cooking and home management, and of child welfare, nutrition and such like. Here is a strong line of support for the worship of Hygeia.

Infectious Disease in England and Wales

WEEK ENDED FEB. 5

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 2032; whooping-cough, 2116; diphtheria, 733; paratyphoid, 9; typhoid, 5; measles (excluding rubella), 1162; pneumonia (primary or influenzal), 1115; puerperal pyrexia, 185; cerebrospinal fever, 71; poliomyelitis, 7; polio-encephalitis, 1; encephalitis lethargica, 3; dysentery, 161; ophthalmia neonatorum, 70. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Feb. 2 was 1863. During the previous week the following cases were admitted: scarlet fever, 132; diphtheria, 49; measles, 27; whooping-cough, 85.

Deaths.—In 126 great towns there were no deaths from measles or scarlet fever, 1 (0) from an enteric fever, 13 (1) from whooping-cough, 15 (2) from diphtheria, 47 (12) from diarrhœa and enteritis under two years, and 78 (15) from influenza. The figures in parentheses are those for London itself.

Liverpool reported the fatal case of enteric fever. Birmingham had 6 deaths from influenza, Liverpool 5, no other great town more than 3.

The number of stillbirths notified during the week was 240 (corresponding to a rate of 35 per thousand total births), including 37 in London.

Brigadier R. M. LUTON, DMS, at Canadian military headquarters in London, and Brigadier C. B. CHISHOLM, DGMS, at National Defence headquarters in Ottawa, have been granted the acting rank of major-general.

In England Now

A Running Commentary by Peripatetic Correspondents

So I now have the support of the Ministry of Health for my anything but original scheme for our postwar hospitals being built in the country. At least I can see no other explanation of the latest EMS Memo (No. 6), *The Organisation of a Hospital Rehabilitation Department*, unless I am still under the influence of the lovely production of *Alice in Wonderland* which I saw with my youngsters the other week. "This new conception," as the Ministry ingenuously describes it, is to include inpatients from the day of admission to the ward, as well as outpatients. The programme includes remedial exercises; organised games such as medicine ball, volley ball, deck quoits, badminton, cycling and swimming; and occupational therapy which consists of netting, basket-work, stool-seating, embroidery, weaving, carpentry, wood-sawing, gardening, and log-splitting.

Two things strike me about this scheme. First, I do not see how it could possibly be carried out satisfactorily except in a country hospital. What town hospital would have the open space to provide gardening, sawing, cycling and swimming? As the memo says, it is sometimes possible to borrow a park or field, but failing that we should have our patients seeking rehabilitation by cycling round the business blocks and tenements, dodging the traffic and followed by enthusiastic spectators, or perhaps by digging the London clay on which their hospital is built, under a pall of pea-soup fog or in the frowst of a London summer. Such recreation, carried out under blue skies with fresh air to blow away the shreds of lassitude and depression, will do more to recreate mind and body than the most intensive course of treatment in the basement of a London hospital.

The other thing that strikes me about this memo is the inopportuneness of its appearance at the present moment. Let us be frank. Many of the more conservative (not using this term in its political sense) members of the profession are suspicious of what they consider the political boosting of "this rehabilitation ramp." They feel, wrongly no doubt, that their patients have got on very well in the past without all this fuss about rehabilitation, and they see no reason why they should not do so in the future. These same doctors, like all of us who have been left behind to tend the civilian sick, are grossly overworked, and their tempers are becoming frayed. They already find the utmost difficulty in coping with their work, and feel they are not doing justice to their patients, simply because of the want of time. And now the Ministry of Health comes along with their bright plans—"bed-fast patients, ambulant inpatients, and selected outpatients should all share in rehabilitation." Rehabilitation is to be "under the personal supervision of a single member of the medical staff, whose duties include the maintenance of general oversight of the exercises, &c., given to patients, the prompt examination of anyone complaining of pain or other unfavourable reaction, and the holding of regular conferences with members of the rehabilitation staff." The physician or surgeon in charge of a case is personally to meet the Interviewing Officer (from the Ministry of Labour) and discuss with him the type of employment for which the patient would be capable. All this, admittedly, "wherever possible." Extra masseuses are to be employed, as well as "fully trained occupational therapists," workshop instructors and gardeners.

This is commended to doctors who are unable to obtain masseuses for the bare essentials of therapy. Where are the occupational therapists to come from who possess the "War Emergency Diploma or the 1943 Certificate of the Association of Occupational Therapists?" Where are we to find the medical officer to take charge of the scheme when the Government will not even allow us sufficient house-officers to run our hospitals reasonably? "Lack of accommodation and shortage of staff restrict the efforts of many hospitals for the time being." You're telling me! Let the author of this memo come and act as my house-officer for six weeks; if at the end of that time he still considers that his scheme is capable of immediate application at my hospital, then I swallow every word I have written.

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An old man myself, I have enjoyed turning over the pages of Dr. A. L. Vischer's book *Das Alter als Schicksal und Erfüllung* (Benno Schwabe, Basle), which I may roughly translate as "Old Age as Destiny and Fulfilment." Here one meets with the broad sympathetic aspects of old age, in all its bearings, which one would expect from the author of *Barbed Wire Diseases* (1918)—he had visited the great European internment camps during the last war—and from one who for nearly 20 years has been doctor to the home for aged persons of the city of Basle. He deals with his subject under three headings: (1) old age as bodily and spiritual process; (2) the length of life; (3) community and individual in regard to the attitude towards old age. It has often been pointed out that the mind may work splendidly despite, perhaps even partly because of, the physical disabilities of age. How well might the ripe judgment and mellow sympathy of the old work in combination with the physical strength and spontaneous activity of the young! But in old people, alas, the intellect not rarely limps like their legs: *claudicat ingenium, delirat linguaque mensque* wrote Lucretius, and in that respect Seneca was correct in saying: *senectus insanabilis morbus est.* Even in quite early old age, in the midst of conversation, the speaker may be held up by sudden forgetfulness of names and other words, so, as in a foreign language, he has to say what he can instead of what he would like. Later owing to failure of normal mental inhibitions the old man may become garrulous, regardless of his knowledge and experience. Youth indeed would often have a poor chance but for these physical and mental disabilities connected with old age.

No-one nowadays would deny the influence of heredity on length of life and on premature degeneration in the various organs and systems. Even in normal individuals some parts of the body show relatively early signs of degenerative changes (e.g., loss of elasticity in the lens of the eye), and George Wither (*Emblems*, 1635, p. 45, after Manilius) is almost literally right: "As soone as wee to bee begunne, We did beginne to be undone." Vischer quotes R. Lichtwitz's story how the grandfather, who could no longer hear the chirping of crickets, declared that crickets had ceased to exist and that the world had altogether deteriorated since the good old times. Tendency to premature senility is shown in A. Vogt's observation on cataract in uniovular twins and tendency to longevity may be hereditary; but undoubtedly moderation and hygienic living (true "macrobiotics") may help heredity to the attainment of a healthy old age.

According to orthodox medieval Christianity a "good" death was regarded as the crown of life. It may be that a good old age (with all its usefulness and even gracefulness) has more claim to be regarded as life's crown. If formerly it was: "Think much of death in order that you may live well and die a good death" (there were little illustrated handbooks, now valued by collectors, on how one might die well and win that crown); nowadays one might say: "Think often of old age so that if and when you become old, with your mental faculties more or less unimpaired, you may worthily and happily fill and perhaps even adorn your necessarily responsible position in the world before leaving it." Surely the study of geriatrics is as much justified as that of pædiatrics—which, by the way, as a specialty was not long ago as strongly opposed by some members of the medical profession as geriatrics is today. Homeric man, Vischer remarks, saw others ageing but never foresaw his own old age. To complete our modern iliad research is needed in geriatrics. To this end Dr. Vischer's book, with its pleasant and instructive reading, and its valuable bibliography, might well be made available in English.

* * *

Americans landing in this country get a pamphlet warning them about our manners and customs, and I'm beginning to think something of the same kind might be given our own returning soldiers. Their homeland has altered more than some of them suppose. Letters reaching them abroad have probably made light of home troubles—and very rightly. But it's a pity when this leads to their being disappointed or unappreciative or even critical when confronted with Things as They Are.

In our village we were all very glad and thankful to see Captain A again; but his month's leave wasn't the success it might have been. He didn't think much of his wife's clothes (poor girl); he considered it rather incompetent of her to spend so much time in buying and preparing food; and he wasn't at all pleased to find a peculiar old married couple living in the house instead of maids. Before the end of the month the rather peculiar couple had disappeared, and so had the entire family reserve of tinned and bottled provisions. We all still love Captain A; but he didn't quite realise that the home front, though strong of its kind, is in places rather lightly held.

Parliament

ON THE FLOOR OF THE HOUSE

MEDICUS MP

THE House has spent two days on the Education Bill and got as far as clause 6. As there are 111 clauses and 9 schedules the bill seems likely to be a regular feature of Parliamentary business until Easter—if not beyond. Parliament is at its best in considering a detailed measure of this kind which affects every locality in the country, for everyone has the opportunity of contributing usefully to discussion. The 400 amendments are not of course all being taken; some are redundant, and others referring to the same subject can be grouped.

Up to the present, amendments of medical and health importance are few. There is an amendment to clause 8 which prescribes the duties of local education authorities for the provision of primary and secondary schools, nursery schools, special schools for handicapped children, and boarding accommodation (a new departure) where necessary. To this it is proposed to add a subsection on the provision of meals for school-children on school premises. Clause 46 deals with medical inspection and treatment which is extended to pupils attending the young people's colleges which are to be set up to provide school-leavers with regular continuing education. The present gap in inspection and treatment between the ages of 14 and 16 will thus be filled. An amendment has been put down to this clause in the names of a number of members of the Parliamentary Medical Committee

"... to provide for an inspection of the pupil's home conditions by the school medical officer if in his opinion this is necessary for the purpose of determining the cause of any illness or defect or incapacity seriously affecting the pupil's health and preventing him from profiting by education at school or young people's colleges."

This amendment is confined to inspection—domiciliary treatment is outside the scope of the school medical service, but it brings for the first time conditions in the home into direct relation with school medical inspections. This realisation of the interdependence of home and school has been made more vivid by the war. Overcrowding as well as deterioration of housing has become a bigger factor in the lives of children. At a recent conference of school care committee workers on home and school in London, Mr. H. C. Dent, editor of the *Times Educational Supplement*, put the matter shortly, when he said "it will be positively harmful to these children to provide them with palaces for schools and to leave them with pig-styes for homes." Another pointer in the same direction came from the education committee in Manchester which reported in June last year "that no reorganisation of any educational system can provide at present equality of opportunity for all the children in a great city" because of the need of replanning the city and re-educating parents in their duties and responsibilities. The Youth Advisory Council set up by the Board of Education say, "Until these physical conditions of housing are radically changed much of what is done for young people can be no more than tinkering."

There will be other medical amendments to the bill and there are also amendments designed to make impossible the employment of children out of school hours. Many at present work before and after school, at week-ends and during holidays to earn a small wage. It is not certain that the discussion on employed children can be brought within the scope of the bill, but there is a consensus of opinion in the House that this employment should be limited if not abolished.

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Another debate on the war, to be introduced by a speech from the Prime Minister, is promised for an early date, and there is also likely to be a debate before long on reconstruction. Lord Woolton has a great reputation as Minister of Food, and the House hopes that he will be able to present to Parliament acceptable reconstruction dishes.

FROM THE PRESS GALLERY

Postwar Housing

IN the House of Lords on Feb. 8 Lord ADDISON asked the Government what steps they were taking to meet requirements for postwar housing. It had been estimated, he said, that at least 4 million additional houses would be needed apart from industrial and commercial buildings and the continuation of slum clearance. This prodigious programme would mean the complete mobilisation of the building industry for many years, which would be impossible without some form of unified direction. Speaking as one who had the responsibility for starting a national housing scheme in 1919 Lord Addison said he had no initial prejudice against rapid emergency provision, even if the houses so provided were not all that might be desired. But for their permanent homes people would want good cooking and washing facilities, better larders, coal sheds, a place to hang up wet coats and keep their boots. Lord Addison looked forward to seeing more provision for these kind of things and less room for the aspidistra. Large-scale building meant standardisation of fittings and household requirements of all kinds—such as cooking stoves, boilers, windows, doors, even perhaps refrigerators, and the Government should make arrangements with the building industry in advance. The problem should be tackled with the spirit and vision shown in the provision of aeroplanes and tanks.

Lord PORTAL, Minister of Works, began by assuring the House that when the time came to begin building houses again the agricultural population would get their share. Lord Woolton, Minister of Reconstruction, was keeping in close touch with him on all the broader questions of postwar reconstruction. By agreement with the Ministry of Health the Ministry of Works were putting up a number of houses to demonstrate the use of different materials in permanent house construction and to ascertain the costs. These houses would be built to similar plans of 850 superficial ft., except for two pairs of 900 superficial ft. built to plans approved by the Dudley Committee in advance of the submission of their report. Experiments in the conversion of war-time hostels for temporary houses were being made, but if they were successful and economical only hostels constructed of brick, timber or concrete close to a town would be considered for conversion.

In view of the probable shortage of labour for building permanent houses in the two years interregnum after the war the Government had gone some way in getting out plans for temporary prefabricated houses. The first prototype made by hand would be ready at the end of April for inspection by the Minister of Health. The Government had decided that if approved these houses should be publicly owned and licensed for a period. At the request of the Ministry of Health the Ministry of Works were carrying out an actual experiment in the temporary division of new houses into two small one-bedroom and two-bedroom flats. They were also exploring with certain local authorities the extent to which it would be economical and practical to convert large houses in urban areas into comfortable flats. Private interests were being encouraged and stimulated in the investigation and development of alternative methods and materials and of prefabricated equipment. The Ministry of Works had been carrying out a considerable degree of standardisation of essential fittings and components. The Governments long-term building programme was divided into two—the interregnum period of the first two years and the following ten years. The interim programme was now satisfactorily taking shape.

Replying to a debate which followed Lord Portal said that if prefabrication was found satisfactory, subject to price and other comparisons, it would be used for temporary or permanent buildings.

QUESTION TIME

Production of Penicillin

Mr. D. ROBERTSON asked the Minister of Supply the number of manufacturing chemists in Great Britain; how many of them were producing penicillin; and would he give their names.—Mr. C. PEAT: I regret that precise information as to the number of manufacturing chemists in Great Britain is not available, but it is certainly large. It would not be in the public interest to publish the other information asked for.

Mr. ROBERTSON asked the Minister (1) what new buildings he had authorised to be erected for the production of penicillin; and their extent, cost, completion dates, occupiers and owners; and (2) what existing buildings he had authorised to be used for the production of penicillin; and for whom were the premises requisitioned.—Mr. PEAT: It is regretted that it is not in the public interest to publish the information asked for.—Mr. ROBERTSON: Members are sent here to serve this country and their constituents and surely there can be nothing against the public interest in this question.—Mr. A. BEVAN: Ministers hide behind that formula all the time.

At a later stage Mr. Bevan on a point of order raised the question with the SPEAKER, who said any minister could refuse to answer questions. He could not direct the Minister to give an answer, though the House might be dissatisfied with the Minister.—Mr. PEAT interposed that he took full responsibility for the answers which he had given that day. If Mr. Robertson's questions had been answered in detail full information would have been given as to the position and the scope of the production and development of penicillin in this country. He believed that penicillin at this moment was as vital to us as the most secret weapon we were producing, and if he gave full information it would lay our production of penicillin open to air attack.

Young Prisoners in Holloway Prison

Miss E. RATHBONE asked the Home Secretary what was the present daily average number of young prisoners in Holloway Prison; how many of them were aged 16 and 17; what extra allowance of food was made beyond the adult prison diet; how many classes were held for them and what subjects were taught; and on how many nights in the week were these young prisoners finally locked in their cells at tea-time.—Mr. H. MORRISON: The daily average of women under 21 has been during the last nine months about 120, of whom about 50 are serving prison sentences and the remainder come in and out for short periods on remand or on committal or recall to Borstal institutions. On Feb. 8 there were in the prison 5 girls aged 16 awaiting removal to approved schools or Borstal institutions, and 14 girls aged 17, of whom 7 were on remand and 3 awaiting removal to Borstal institutions. I am advised that the prison diet is fully adequate for these young prisoners, but the medical officer can order extra nourishment whenever necessary. The evening arrangements have been a matter of anxiety to the Prison Commissioners and myself. Owing to the shortage of staff and the difficulty of finding suitable recruits, evening activities have had to be drastically curtailed. There is a class in toy-making and special arrangements are made from time to time to get young prisoners out of their cells, but many of them have to be locked in their cells from the time when the last meal is served. Arrangements have, however, been made, which I hope will be completed in the next few days, to appoint a house-mistress to look after the welfare of the younger prisoners, and as soon as this appointment is made it should be practicable to make substantial improvements in the evening routine.—Mr. W. ASTOR: Would the Minister consider having the prison dietary examined by experts of the Ministry of Food to see whether it contains the necessary vitamins?—Mr. MORRISON: I will look into that. I thought we had expert advice.

Regulation 33B

Up to Sept. 30 last, 213 men and 3131 women had been reported under Regulation 33B as alleged sources of infection. Of these 209 men and 2907 women were the subject of one report only, and of these 543 were persuaded to undergo voluntary examination. Of those who were the subject of more than one report, 1 man and 73 women had undertaken treatment voluntarily, up to Sept. 30, and 1 man and 77 women had been brought under treatment after the serving of notice. A number of the reported cases cannot be traced from the particulars given. (Mr. H. WILLINK replying to Mr. A. PEARSON.)

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Public Health

MITES IN FOOD

AT Bristol recently a consignment of flour products worth £500 was found to be infested with tyroglyphid mites and unfit for human consumption.

At a routine visit to the warehouse of a reputable firm, the food inspector was asked by the manager to examine some 300 cases of flour products, packed in tins, about which complaints had been received. He found them to be so heavily infested with mites that the mixture seemed to be "working." Under the microscope the mites could be seen in particles of mixture, and in some of the tins there seemed to be more mites than flour mixture. Samples were sent to the public analyst who reported them unfit for human consumption either because of infestation, decomposition or both. Mr. F. J. Redstone, the chief sanitary inspector, notified the various bodies likely to be interested, including the Ministry of Food (both the salvage and infestation branches), the medical officer of health and the manufacturers. Factory and warehouse were specially inspected and methods of prevention were discussed. The Ministry, the MOH and the packers all agreed that the material had been stored too long under unsuitable conditions.

In a survey [1] recently published by the Department of Scientific and Industrial Research, Solomon points out that our information about tyroglyphid mites is very defective. They prefer stored products to be moist, and multiply best when the temperature is between 18° and 25° C. They are killed by heat, the temperature depending on the species; most species die after a few minutes' exposure to a temperature of 60° C. though a few require as much as 145° C. or even 180° C. to kill them. They resist low temperatures fairly well, but become dormant at about − 4° C.; at 3° or 4° C., however, they continue to feed. Isolated mites are killed by 24 hours' exposure to − 29° C.

To prevent infestation, foodstuffs should be stored as dry as possible, in dry, well-ventilated weatherproof quarters. Insects, rodents and birds all distribute mites, and should be excluded. Dust and dirt should be swept up regularly, and infested materials destroyed or treated to kill the mites.

Heating, drying, fumigation and toxic washes have all been used to disinfest goods invaded by mites. Drying is the most effective but may be difficult or inappropriate to carry out, and foods cannot always be subjected to heat without change. Fumigants have been widely used, including carbon disulphide, chloropicrin, hydrogen sulphide, benzene, paradichlorobenzene, naphthalene and benzol, all of which have been applied, with varying success, to stored grain. Chloropicrin is said to have given good results in Canada, and non-toxic dehydrating dusts are promising. There are objections of course to using poisonous fumigants on food. For empty infested warehouses they may be more valuable, but eggs of tyroglyphids resist many fumigants, including hydrogen cyanide. Washing or scrubbing with carbolic is a good way of treating woodwork. Pyrethrum and nicotine, the common insecticides, are ineffectual against mites. Hermetic sealing has a limited application. Mites can be removed from flour by sifting it through silk, and from grain by passing it through a cleaning machine.

On the whole, removal of mites once they have a hold is a serious and elaborate undertaking. Prevention of infestation is easier, and sound dry storehouses are the first need. A practical suggestion from Bristol is that the Ministry of Food should require labels on packings to be stamped with a date before which the contents must be used. This would discourage wholesaler, retailer and consumer from storing foods to long.

The question of what should be done with food spoiled by mites cannot be answered without more knowledge. Cases of colic and diarrhœa in horses and dogs have been ascribed to tyroglyphids in food, and they have been suspected of causing allergic manifestations in man. In cases of mild infestation the food could probably be used for animals after being disinfested. Heavy infestation presumably means complete wastage.

1. Solomon, M. E. Tyroglyphid Mites in Stored Products. HMSO. 1943. 9d.

Continued from previous page

Silicosis Compensation

Since July 1, 1943, when the Pneumoconiosis Compensation and Benefit Schemes came into operation, the medical board have granted certificates of disablement or suspension in 2 cases under the compensation schemes in the North Midland Region and refused 25. One death was certified to have been caused by the disease and one was certified not to have been so caused. In the same area 6 applications have been dealt with under the benefit scheme, 5 in respect of disablement and 1 death. In none of these cases was a certificate granted. The medical board's decisions for purposes of a claim to compensation or benefit are conclusive and are not subject to review.

Letters to the Editor

SULPHONAMIDES AND GONORRHŒA

SIR,—I read Dr. Harkness's criticism of the MRC War memo No. 10 with interest. I have found that if gonococci are still present after 3 days treatment with one of the sulphonamides, using at least 4–5 g. per day, it is imperative to change the preparation straight away. In dealing with sulphonamide failures after two adequate courses I do not think it inappropriate to carry out some further investigation (instrumental or digital) of the patient. The nature of the investigation and the delicacy with which it is carried through is important. I have seen no harm arise from a gentle digital examination of the prostate gland, &c., nor from urethroscopy, after the urethra has been irrigated, using local anæsthetic and full air dilatation. The repeated passage of straight bougies combined with palpation or massage thereon is useless. I do not believe early folliculitis can be detected or treated in this way, and the procedure is likely to damage the already inflamed urethra, and prolong the infection. I have found sulphanilamide suppositories, b.i.d., useful in cases of prostatic involvement, when combined with other forms of chemotherapy.

I agree with Dr. Harkness that cultures are unnecessary as tests of cure in the male. A smear of the prostatic vesicular fluid is more liable to wrong interpretation, and gives less reliable information than a gram-stained smear of the deposit obtained from the prostatic fluid by centrifuging and washing with saline.

Straightforward cases often produce a positive complement-fixation test about 2–4 weeks after clinical cure. When tests are repeated every fortnight the readings gradually come back to negative in a varying time without any treatment. Opinion on the value of this test varies, but is this phenomenon possibly a delayed over-reaction of the body's immunological response to a cured infection? Or does it indicate a non-draining focus which remains undiscovered by ordinary methods of examination?

Edinburgh, 12. G. M. THOMSON.

SHALL BASSINI DIE?

SIR,—There is one vital item in the cure of a hernia which merits emphasis. It is the Time Factor: the earlier a hernia is operated on, the better are the chances of a cure. Therefore it is for the medical profession to articulate in season and out of season that the treatment of a hernia is by early operation. Gone must be the days when patients are given the choice of operation or truss. A radical cure must be the only remedy and surgeons will see to it that it is a cure. It can be done, as was proved before the war, by "hernia-minded" surgeons like Pearce Gould, Morrison and Wells of Liverpool, Geoffrey Keynes and others.

I find my hernia experience running parallel with that of my friend and teacher Mr. Nuttall. My adoption of a Bassini operation began about 1935, and having learnt how to do it, whatever is said on theoretical grounds, from a fairly careful follow-up, I know it works. I know of 3 recurrences in 268 patients, with 1 death.

I was interested in Mr. Nuttall advocating the continuous stitch of catgut. I use interrupted fine thread sutures, yet our results are the same. I read into this that the cure does not rest on one item, but on the sustained management from the moment the patient is

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seen until he returns to work. Another technical point worth mentioning is that of a complete exposure of the posterior wall of the inguinal canal in the larger hernias, by detachment of cremaster with the spermatic cord from beyond the pubic spine to the internal abdominal ring. It shows the condition of transversalis fascia and also exposes an occasional second sac, direct or indirect, or (what is perhaps more common) a bulge at the inner side of the neck of an oblique sac about the deep epigastric artery. Recurrent hernias are in some instances new hernias, being a different type of sac to that first operated on; for instance, an indirect hernia may be followed by a direct hernia, and less often vice versa. I think in the latter condition the indirect sac was possibly overlooked at the first operation. The exposure mentioned above assists a complete operation.

London, W.1. HAROLD DODD.

CORTICOTROPHIN

SIR,—In your annotation of Feb. 5 (p. 188) you mention "A recent and unexpected claim" to separate the corticotrophin molecule from other pituitary hormones by ultrafiltration. In 1935, in my monograph on the pituitary in Oppenheimer's *Handbuch der Biochemie* (vol. III, p. 1059), I pointed out that the molecule of corticotrophic hormone is smaller than that of other hormones, and in 1934 Anselmino and others (*Klin. Wschr.* **13**, 209. *Z. exp. Med.* **94**, 323) had described a method for its separation by the use of appropriate collodion membranes. Having thus for the past nine years used this and similar methods for the separation of corticotrophin, I can assure you that your doubts as to the purity of the corticotrophins used in our experiments on shock are groundless.

Stapleton, Bristol. MAX REISS.

BISMUTH COMPOUND FOR ARTHRITIS

SIR,—Some years ago, on the Gold Coast, I made the acquaintance of 'Sobita' (sodium bismuth tartrate), which was extensively used in the treatment of yaws. It was introduced over 20 years ago by Messrs. Howards and Sons, and has been in the *BP* since 1936. Yaws runs a course similar to syphilis, and in the tertiary stage arthritic changes are common. Sobita acted like a charm. The natives were so impressed that they would trek in many miles from the bush with all manner of disorders. I was able to try its effects in rheumatic arthritis which was clearly not due to yaws. The results were so good that I determined to try it on rheumatism in this country.

In the last 18 months, at the Charterhouse Rheumatism Clinic, I have tested the drug in upwards of 100 cases, including fibrositis, capsulitis, osteo-arthritis, infective and rheumatoid arthritis and spondylitis. The infective group of arthritides showed the greatest response—sometimes dramatic—so that I began to concentrate on it. These cases had proved resistant to all the usual methods of treatment and most of them were old-standing. The following are typical examples.

CASE 1.—Man, aged 44. Civil-defence rescue worker. Infective arthritis. Hands, wrists, feet and ankles especially involved. Much loss of movement, swelling and pain. Duration 6 months. In all, 9 doses of gr. 1 sobita given at fortnightly intervals. Recommenced work after third dose.

CASE 2.—Housewife, aged 25. Rapidly advancing case of mixed arthritis (rheumatoid and active infective) of 2 years duration, following childbirth. Hospital inpatient 5 months; had injections (? gold) but developed rash and was discharged. No benefit. Then vaccine treatment for 2 months without benefit. When seen by me hands, wrists, elbows, shoulders, knees, ankles and feet all involved, with much swelling, pain and restricted movements. Sobita commenced April 27, 1943, in doses of gr. 1. Attendance irregular but improved from start and had largely recovered after 3rd dose; then only attended every 2nd or 3rd month. In all had gr. 6 up to Dec. 7, 1943.

CASE 3.—Woman, aged 62. Rheumatoid arthritis for 40 years. Occasional remissions in early years but steady progress of diseases for last 20. Various treatments all of no avail. Had attended CRC for 4½ years and received vaccines, gold and physiotherapy. Wrists partially ankylosed, fingers flexed, distorted and almost immovable. Knees, ankles and feet so stiff and deformed that walking was extremely difficult. She had 16 doses of sobita gr. 1 spread over 12 months. By then she was not only able to do her own housework but cultivated a small allotment.

I use the drug dissolved in aqueous solution made isotonic by addition of glucose, autoclaved and preserved in rubber-capped bottles with 0·5% phenol. The strength is gr. 1 to each c.cm. The injections are made deeply into the gluteal muscles. Most cases have slight local reactions for a few days. Focal reactions of varying intensity occur for a few days followed by definite improvement. Repeat doses are never made under a fortnight and soon the period is extended to 3, 4 and even more weeks.

Whether arthritis can be permanently arrested and function restored remains to be seen. I am however more than satisfied that a large proportion of cases can be benefited and saved from complete crippledom.

I should like to thank Dr. H. Warren Crowe and my colleagues on the staff of the clinic for providing obstinate cases for the test; Dr. W. H. Kauntze and the Director of Medical Services, Gold Coast, for advice; and Messrs. Howards and Sons for overcoming chemical difficulties.

London, W.1. PERCY HALL.

POSTGRADUATE DEGREES

SIR,—Surely it is wrong that doctors in civilian life should conjure Service MOs to work harder, when these civilians know nothing of Service life and its uncertainties. And why is it that newly qualified doctors are allowed to avoid call-up and so continue their work for higher qualifications? I know of several instances; and many others will support me in this. Meanwhile, older doctors are being called up, homes broken up, practices and experience ruined. Is it not that the methods used for call-up of doctors need changing?

Northern Ireland. FLIGHT-LIEUTENANT.

Obituary

EDWARD REGINALD MORTON

MD TORONTO, FRCSE, DPH

Dr. Reginald Morton, who died on Jan. 21 of cerebral thrombosis, was one of the early pioneers in the application of Volta's and Röntgen's rays to medicine. Born in 1867, third son of Dr. Edward Dean Morton of Barrie, Ont., he graduated MD from Trinity College, Ontario, in 1890. Shortly after qualifying he accompanied Lord Brassey as medical officer on a voyage in the *Sunbeam* to Melbourne. On his return he joined his father in practice for a short time before setting out for Edinburgh, where he took his FRCSE with distinction in 1893. In 1897, after resident experience in Edinburgh and Glasgow, he settled in general practice at Taunton, where his mechanical bent led him to apply Röntgen's discovery announced in 1895. Morton's work and experiments soon began to attract attention, and he moved to London to specialise in the new subject. For six years he was in charge of the X-ray and electricity department of the London Hospital, where he devoted himself to developing the then very crude apparatus available. In 1909 he accepted an appointment at the West London Hospital which he held until he retired; along with Souttar and Harman his postgraduate teaching there made a memorable period in medical education. The last war, during which he was radiologist to the 2nd London (General) Military Hospital, separated him from his colleagues abroad but as soon as it was over he visited his friend Professor Schrumpf at Erlangen and returned to introduce into this country deep X-ray therapy for carcinoma of the uterus. As a result of his enterprise the West London was the first of our hospitals to be equipped with the apparatus. In 1922, accompanied by the late General Fotheringham, RCAMC, Morton toured Canada and the United States lecturing on the new technique. In 1926 he retired to his summer home at Gullane where he led a happy and active life which, till his last illness, was unclouded by ill health, for he was one of the few X-ray pioneers who suffered only minor damage from the rays. His hobbies were golf, shooting and watchmaking, and he was never so happy as

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when busy in his workshop, elaborating with his own hands devices which are still in regular use in many electrical departments. His *Medical Electricity and Radiography* appeared first in 1910 and a second edition of his *Textbook of Radiology* was published in 1918. For many years our own columns never lacked some contribution of his about a new method or some new application of an old one, and THE LANCET benefited from his guidance.

Dr. Morton married in 1907 Miss Margaret Handyside, and they had one son, Dr. J. E. C. Morton, now serving with the RAF.

CLIVE EDWARD HARRISON

CMG, CVO, MB LOND, FRCS

Lieut.-Colonel Charles Harrison, who died at Redhill on Jan. 25 at the age of 91, was the son of Surgeon Major John Harrison, Grenadier Guards, who served in the Peninsula and at Waterloo. He was educated at Wellington College and St. Bartholomew's Hospital, graduating MB with honours in 1876, two years after he had received his commission. He was gazetted to the Grenadier Guards in 1875, saw service in Egypt at Mahuta and Tel-el-Kebir, and in 1891 became brigade surgeon lieut.-colonel to the Foot Guards—the last to hold this appointment. He was a man of great charm and courtesy, and while each Guards regiment had its own hospital and medical staff his brother medical officers looked on him as their consultant. When Queen Alexandra's Military Hospital was opened at Millbank in 1905 Harrison was the obvious choice as its first commanding officer, holding this post till he retired in 1909, just over a century after his father was gazetted. During the last war he was in charge of Prince of Wales's Hospital for convalescent officers (at Great Central Hotel) and in 1918 he became deputy commissioner of medical services to the Ministry of National Service. At his burial buglers of the Grenadier Guards sounded the last post and reveille.

Births, Marriages and Deaths

BIRTHS

CUNLIFFE.—On Feb. 11, at Watford, the wife of Dr. Anthony Cunliffe—a son.

MACLAINE.—On Feb. 11, the wife of Squadron-Leader F. V. Maclaine, MB, of Morley, Yorks—a son.

MCOWAN.—On Feb. 6, at Wellington, Salop, the wife of Surgeon Lieut.-Commander B. M. McOwan, RNVR—a daughter.

RUSBY.—On Feb. 9, to Dr. Elizabeth Rusby (née Broadhead), wife of Dr. Lloyd Rusby, of Hertford Heath, Herts—a son.

SHAW.—On Feb. 7, at Kelvedon, the wife of Dr. J. P. Shaw—a daughter.

MARRIAGES

HYLTON—PETERSEN.—In January at Poona, William Hawkins Hylton, captain RAMC, to Lorna Christine Petersen, lieutenant IAMC.

LENDRUM—DAVIES.—On Feb. 12, John Denis Lendrum, surgeon lieut.-commander RNVR, to Enid Sylvia Davies, MRCS, of Exeter.

MACDONALD—GRAY.—On Feb. 9, at Welwyn Garden City, David Moffat Macdonald, captain RAMC, to Kathleen Marie Gray.

MCQUEEN—GOING.—On Feb. 5, at Shrewsbury, Ewan Garth McQueen, surgeon lieutenant RANVR, to Marion Constance Going, third officer WRNS.

DEATHS

BATY.—At Rochampton, Benjamin Baty, MB EDIN., DPH.

CONDON.—On Feb. 13, at Exmouth, Edgar Hunt Condon, MB ABERD., LRCSI, colonel RAMC, retd., aged 75.

FULLARTON.—On Feb. 11, at Haslar, John Fullarton, MB EDIN., surgeon captain RN, retd., aged 65.

HORNE.—On Feb. 7, at Rickmansworth, Maynard Horne, MB CAMB., aged 73.

MAY.—On Feb. 12, at Clare, Suffolk, Sir Gould May, MD CAMB., MRCP, aged 80.

PLAYNE.—On Feb. 6, Basil Alfred Playne, DSO, MB CAMB., air-commodore RAF, retd.

ROSS.—On Feb. 11, at Campden, Glos, John Stuart Ross, MB MANC., FRCSE, aged 69.

WATTS.—On Feb. 5, at Wallingford, Berks, Harry Watts, MRCS, aged 84.

MEDICAL CASUALTIES.—The following medical casualties have been announced:

Missing at Sea.—Lieut.-Colonel Thomas Swan Eves, MB DUBL., RAMC.

Prisoners of War.—Captain A. Y. Adam, MB EDIN., RAMC; Captain J. A. Glover, MB CAMB., RAMC; Captain Bernard Lennox, MD DURH., RAMC; Captain E. A. Smyth, MB DUBL., RAMC; Major F. L. Webster, FRCSE, RAMC.

Wounded.—Surgeon Lieutenant J. C. Bulstrode, MRCS, RNVR.

Notes and News

PRIVATIONS AT SEA

Atlantic Torpedo is the narrative of Doris M. Hawkins, a trained nurse, who was passenger on a liner torpedoed by a German submarine off the West African coast in September, 1942. After a night and day on a small raft she was rescued by the submarine, which had spent the day picking up survivors and distributing them in lifeboats. The German officers and many of the men gave up their bunks to some of the 200 they accommodated on board; they "treated us with great kindness and respect the whole time." Arrangements were made for a rendezvous with Vichy French vessels, and meanwhile the U-boat and her consorts kept watch over the 14 lifeboats. On the 4th day however she was sighted and bombed by an Allied aircraft, and could stay on the surface no longer. It was impossible to submerge while carrying so many extra people, and after a swim Miss Hawkins found herself packed into a 30-foot lifeboat with 67 others, including Dr. Geoffrey Purslow, the ship's surgeon. Much of the boat's proper equipment was missing; but they had a compass, and with an oar and tarpaulin as mast and sail they eventually set out for the African coast, at least 600 miles away.

Rations were very small. In the morning they had 4–5 Horlick's tablets, and 3 pieces of chocolate ($1\frac{1}{2} \times \frac{3}{4} \times \frac{1}{4}$ in.), but no water. At 5 PM they had 2 ship's biscuits (size of petit beurre), 1 teaspoonful of pemmican, and 2 oz. of water. Cold chilled them at night and intense heat dried them by day; they ceased to sweat, their nails grew pale and brittle, and "after a few days we all became a little light-headed, and were unable to sleep, but dozed lightly, and dreamed always of water, cool drinks, fruit. . . ." Some, "despite all warnings, drank salt water and succumbed." Many, including the author, had been injured, and there was no medicine chest. By the end of the journey all had salt-water sores, septic fingers and boils; a week previously Dr. Purslow, having contracted septicæmia, had followed the example of Captain Oates. A downpour of rain arrived when the water was finished; they were soaked and several developed earache, but "even that could not depress us now." Two men had parotitis but one recovered.

After travelling more than 700 miles in 27 days, 16 survivors landed in Liberia where they had a friendly welcome from the natives. Recovery from the voyage was slow. "At first I had great difficulty in swallowing solid food; my throat seemed to have contracted, and it was necessary to swallow most things with a drink of water. All the digestive tract had to get into working order again, and my salivary glands became swollen and painful. Even the smell or sight of fruit made them ache, as the saliva became active. Our thirst was unquenchable, and we drank quarts for many days and nights. After a few days a small sago-like blister formed over each pore all over our bodies and limbs, and even our fingers and toes. It was the perspiration forming again and trying to come through the closed pores. We were covered in hundreds and hundreds of these tiny blisters, and had to scratch our skins to break them; then our skins could recommence to function." For several months Miss Hawkins dreaded sleep because of the nightmares it brought.

This plain tale of fortitude is published at 1*s.* by Gollancz.

THE HEALTH FILM

HEALTH teachers and educational film experts met in New York last October to discuss current films and their use, the need for new films and the responsibilities of the government and the cinemas. Too many messages, it was suggested, were crowded into short films; some of the subjects treated might be explained better through another medium; many of the health films appealed only to the intellect, excluding the emotions; emphasis was laid too much on avoidance of disease rather than on positive health; and sound tracks were technically poor. Representatives from Great Britain and Canada gave their experience of government production. Our Ministry of Information films have fitted well into ordinary cinema programmes, and food and fuel flashes are amusing and popular. There was general agreement at the conference that existing health films should be classified and a survey undertaken to estimate the need for new films. The section on health and medical films of the American Film Centre is to form an advisory committee to go into the matter. A report of the conference appears in the Dec. issue of *Film News* (New York).

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REPRINT OF "DAMAGED GOODS"

Eugène Brieux's sincere and well-written play on syphilis (Jonathan Cape. 2*s.* 6*d.*) was never wholly suited to an English audience partly because of differences of custom—wet-nurses are rarely employed here—and partly because the emotional response of the characters seems to us to border on extravagance. Nor is it fully satisfying as drama; the last act is given up to a series of interviews illustrating results of the disease which would have been better placed earlier in the play, and none of the principal characters, except the doctor, appears in it. Propaganda plays, unless written by W. Shakespeare, are seldom successful works of art, perhaps because the argument too often twists the characters out of the round or leaves them with yawning gaps in their structure. Nevertheless this is certainly one of the best plays on syphilis so far written: it sets out the facts directly and gives full due to the hope and promise of thorough treatment. In re-issuing Sir John Pollock's translation the Ministry of Health has done a useful public service.

University of Oxford

At a congregation held on Feb. 8 it was resolved to confer the degree of MA on Mr. Pomfret Kilner, Nuffield professor of plastic surgery.

The Rockefeller Foundation have given £1200 for biochemical investigations of penicillin under the direction of Prof. H. W. Florey, FRS.

University of Cambridge

On Feb. 5 the degrees of MB, B Chir. were conferred by proxy on J. W. Evans, M. P. Durham, L. L. Bromley and B. W. Rhodes.

University of Sheffield

Prof. E. J. Wayne has been appointed director of post-graduate medical studies.

University of Birmingham

On Dec. 18 the following degrees were conferred in absentia:

MD.—D. R. Humphries (with honours); C. F. V. Smout and C. G. Teall.

MB, Ch B.—Theresa Lazar and Ian Macnab (with first-class honours); Evelyn M. Crawford, Margaret L. Hampton and Margaret D. Thompson (with second-class honours); Kathleen M. Brown, R. A. Chand, Beatrice D. Cluley, Joan R. Collins, Kathleen M. Fox, K. H. Freeman, Ida C. Hughes, R. A. F. Jack, Richard Lindop, Mary S. McGladdery, J. C. Miller, J. M. Mynors, Dorothy J. M. Readman, B. V. Robinson, F. C. Williams, G. F. J. Williams and P. W. Woodcock.

Royal College of Surgeons of England

At a meeting of the council of the college held on Feb. 10, with Sir Alfred Webb-Johnson, the president, in the chair, Surgeon Rear-Admiral G. Gordon-Taylor was appointed Thomas Vicary lecturer for 1944. Mr. P. J. Moir, Mr. N. Sinclair, Mr. W. D. Doherty, Brigadier A. H. Whyte, Surgeon Commander J. B. Oldham, Mr. B. H. Burns, and Surgeon Captain Lambert Rogers were re-elected, and Mr. T. Twistington Higgins and Air-Commodore Stanford Cade were elected members of the court of examiners. Mr. Eardley Holland was reappointed representative on the Central Midwives Board for a further year.

A diploma of fellowship was granted to W. H. Bond and diplomas of membership to A. Brown, T. R. Farrimond, I. L. McKelvie, R. Milton, E. S. Shalon, T. R. Steen, M. J. Williams and to the candidates named in the report of the committee of the Royal College of Physicians in our issue of Feb. 5 (p. 201).

Honorary Medallist RCS.—On the occasion of the Buckston Browne luncheon on Feb. 12 the honorary gold medal of the College was presented to Mr. W. H. COLLINS for liberal acts conducive to the improvement of natural knowledge and of the healing art. Mr. Collins is chairman of King Edward VII Hospital, Windsor, and vice-president (and benefactor) of the Middlesex Hospital. In October last he gave £100,000 (with provision for a further like sum) to extend and develop the department of pathology at Lincoln's Inn Fields and to found there a chair of human and comparative pathology. On the reverse of the medal is Galen contemplating a human skeleton.

Medico-Legal Society

A meeting will be held at 26, Portland Place, London, W.1, on Thursday, Feb. 24, at 5 PM, when Sir Bernard Spilsbury, Prof. W. G. Barnard, Dr. Eric Gardner and Dr. C. Keith Simpson will show specimens and slides.

Medical Honours

The MBE has been awarded to Surgeon Lieutenant J. H. L. Ferguson, MB CAMB. RNVR, for "gallantry and great skill in rescuing and caring for wounded survivors from HMS *Cromarty*." As already announced Flight-Lieutenant R. J. L. Ferris, MB BELF., RAFVR, has received the Military Cross.

During a period in October, 1943, Flight Lieutenant FERRIS's headquarters was subjected to severe enemy air-attacks. On one occasion four men were killed and two others were buried under the debris. Ferris immediately set to work removing the bodies and releasing the buried men. His medical equipment had been destroyed and he was compelled to work with a pair of scissors and a small wood saw with which he succeeded in releasing one man after amputating his leg. He accomplished this while the air-attack was in progress, and working with very little light while held upside down by his legs. During an engagement between British and enemy ground forces he treated military and civilian casualties alike, and worked incessantly under most rigorous conditions.

Royal Medico-Psychological Association

At a meeting to be held at 11, Chandos Street, London, W.1, on Thursday, Feb. 24, at 10.30 AM, papers on convulsion and insulin therapy will be read. In the morning Dr. E. B. Strauss will speak on electroplexy in outpatient practice, and in the afternoon Dr. Joshua Carse will discuss the action and therapeutic indications of convulsant therapy with special reference to gross cytological changes in the blood, and Dr. D. E. Sands modified insulin treatment in neuroses.

Association of Industrial Medical Officers

A business meeting of the association will be held at the London School of Hygiene, Keppel Street, W.C.1, on Saturday, March 4, at 11 AM, and at 2.30 PM Mr. R. A. Brews, Dr. Catherine Swanston and Dr. Joan McMichael will open a discussion on the influence of industry on obstetrics and gynæcological conditions.

Course for the DPM

If there are sufficient applications a three-months course of instruction for part II of the DPM will be held at the Maudsley Hospital, Denmark Hill, London S.E.5, on Monday, Wednesday and Friday afternoons, beginning on Feb. 28. In connexion with this course, twelve demonstrations in clinical neurology will also be given. Further particulars from Dr. W. W. Kay, acting honorary director of the Maudsley Hospital medical school, the Central Pathological Laboratory, at West Park Hospital, Epsom, Surrey.

Medical Services of Southern Rhodesia

Speaking at a public meeting in Bulawayo on Feb. 1 Sir Godfrey Huggins, FRCS, the prime minister, said that the colony had 120 doctors practising, or one doctor to about 12,500 of the population. There was one hospital bed to every 100 European inhabitants and one bed to every 250 non-Europeans (native, coloured and asiatic). Progress had been made with government medical clinics, which had broken down the natives' fear of hospitals and European doctors to such an extent that native hospitals in towns were now overcrowded. Experience had shown that the natives made excellent nurses, medical orderlies and health propagandists. The medical department was now working out a scheme for the employment of 50 European sanitary inspectors, to be followed by the training of twice as many native inspectors. It was also hoped to create a native district nursing service to cover the whole colony.

Appointments

CAHILL, JOHN, B SC NUI, MRCS: temp. senior asst. school MO for Middlesbrough.

GAMES, J. H. P., MRCS: examining factory surgeon for Eccles, Lancs.

GREATOREX, R. W., MB EDIN.: ophthalmic referee for county-court districts of Bradford, Keighley, Otley, Skipton, Dewsbury, Wakefield, Halifax and Huddersfield (circuit no. 12) and Harrogate, Ripon, Tadcaster, York and Leeds (circuit No. 14).

MACDONALD, JAMES, MB GLASG.: examining factory surgeon for Norwich.

SMALL, ALAN, MB NZ, FRCS: visiting surgeon to Tilbury Hospital, Essex.

WESTERMAN, MAY D., MB LOND.: resident asst. MO to the obstetrical and gynæcological dept., St. Helier County Hospital, Carshalton.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export.

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MAR 16 1944

PREVENTION OF NEONATAL DISEASE AND DEATH*

LEONARD G. PARSONS, M.D. LOND., F.R.C.P.
PROFESSOR IN DISEASES OF CHILDREN, UNIVERSITY OF BIRMINGHAM; PHYSICIAN TO THE CHILDREN'S AND UNITED HOSPITALS, BIRMINGHAM

"THERE is no mortality-rate more pathetic, discreditable or unnecessary," wrote Sir George Newman (1939) of infantile mortality; but the statement would be even truer of fœtal and neonatal mortality, which together are responsible for a loss, in England and Wales, of about 43,000 lives annually, compared with 28,000 deaths from tuberculosis and 56,000 from cancer.

Statistics of neonatal deaths first appeared in the Registrar-General's report for the year 1905. Out of every 1000 children born alive in England and Wales in each of the five years 1905–09, 41 died before they were a month old and 81 between the ages of a month and a year, whereas in each of the last five years only 25 died between those ages but 28 died before attaining the age of one month. Is it therefore inaccurate to say that little progress has been made in solving this problem and that Milton's lament *On the death of a fair infant*:—

> O fairest flower no sooner blown than blasted
> Soft silken primrose fading timelessly

is still only too often true? I shall endeavour in this lecture to provide possible reasons:—

> Why from us so quickly thou didst take thy flight.

Hitherto the study of the newborn child has been neglected by British pædiatricians, but recently the work of Cameron, McNeil, Capon, Spence, Graham and Moncrieff has produced signs of the troubling of the water in the pool of Bethesda. The care of the newborn baby usually devolves upon the obstetrician; rightly so when he is a general practitioner but not if he is a consultant. As Cameron (1929) has said, "It is to obstetricians that pædiatrics owes its birth." Nevertheless the mother and baby form one biological unit and it is impossible to separate their interests.

Causes of Neonatal Death

Statistics of neonatal and fœtal deaths are open to certain errors and differences of interpretation. For instance, though "stillbirth" and "dead-birth" are regarded by Somerset House as synonymous terms, some obstetricians differentiate between them, regarding a "dead-birth" as one in which the fœtus does not make any sign of life either within the uterus or after birth, whereas in a "stillbirth" the fœtus shows heart-beat but no respiratory nor other movement. Since in this country the presence of heart-beat is usually regarded as a sign of a "live-birth," even if the baby dies before attempting to breathe, the "stillbirth" of these obstetricians would usually be regarded as a "live-birth." On the Continent, on the other hand, a child is counted a "dead-birth" unless it breathes, even though its heart may be beating; indeed, "It is said that when a little Prussian is born he greets the light of day at attention and with a salute, and if the doctor doesn't shout 'At ease' he remains still until his heart stops beating" (Smith 1942). Eardley Holland (1922) maintains that the only sign of the fœtus having attained the dignity of a child is the onset of breathing, and would class both "still" and "dead" births under the one title "fœtal death."

Again many writers regard prematurity and immaturity as interchangeable terms. This College and other authorities have accepted the definition of a premature child as one who at birth weighs less than 2500 g. (5½ lb.) even though born at full term. Hess (1939) defines an immature infant as one "whether a single or multiple birth born prematurely, at term or even past term, whose weight is below 2500 grammes." On the whole, immaturity is the better term. Another fallacy in statistics is the lax use of the term "asphyxia neonatorum" on death certificates; a recent investigation by Spence and Miller (1942) has shown that in addition to deaths from secondary asphyxia, some children certified as dying from asphyxia never showed asphyxia at all.

Nearly three-quarters of the total neonatal deaths take place in the first week and about half of these on the first day; indeed, the slight improvement in neonatal mortality in the last 30–40 years is due almost entirely to a reduction in the deaths in the last three weeks of the neonatal period.

A survey by Cruickshank (1930) of 800 neonatal deaths in a maternity hospital showed that 67·5% were due to asphyxia, atelectasis, birth injury and prematurity; 29·75% to infection; and 2·75% to gross developmental defect. It is interesting to contrast this group in which death usually occurred before the fourteenth day of life, with one from the Birmingham Children's Hospital in which the fatalities usually affected children between the ages of 2 and 4 weeks. In this series of 706 autopsies, which were spread over a period of nearly twenty years, deaths from infection (42%) and from gross malformation (25%) showed a striking increase. On the other hand, deaths from asphyxia, atelectasis, prematurity and birth injury showed an extraordinary reduction, being less than 11%. Prematurity alone accounted for 4·5%, though an almost similar percentage died from prematurity associated with infection and have been included under that head. Deaths from pyloric stenosis formed 4·8%, from intracranial hæmorrhage 9·8%, hæmorrhagic disease 4·5% and hæmolytic disease 6% of the total. If these two series are combined the causes of neonatal death in 1500 autopsies are roughly: gross malformation 16%; asphyxia, atelectasis, birth injury, prematurity 42%; infection 36%. A survey of 1000 cases in America produced similar results (D'Esopo and Marchetti 1942).

Any reduction in neonatal mortality will produce a relative increase in deaths from congenital malformations because so many of these are incompatible with sustained life, but there is a growing opinion that there has been an absolute increase in deaths from such malformations during the war years. I am able to give some definite information owing to the kindness of Dr. Percy Stocks of the Registrar-General's Office and of Dr. Dorothy Taylor of the Ministry of Health.

The number of deaths from spina bifida and meningocele at all ages fell from 1136 in 1938 to 1086 in 1941, but rose in 1942 to 1413. According to Dr. Stocks increases in live-births and ordinary annual fluctuations might account for an increase to about 1250 in 1942, but there is no obvious explanation for the high figure of 1413. Apart from an increased incidence of hydrocephalus in male infants in the years 1940 and 1941 there have been no other noteworthy changes in the incidence of malformations since 1936. Congenital malformations in human beings cannot as yet be prevented, but this may not always be the case because Warkany and his associates (1943) have shown that if rats are given a deficient diet during pregnancy, their offspring show deformities such as shortening of the mandible, shortening and distortion of the limbs, syndactyly, fusion of the ribs and cleft palate.

I must restrict my remarks chiefly to the four groups: asphyxia, birth injury, prematurity and infections. The recent discovery of the rôle of the Rh factor in hæmolysis has vindicated the view put forward by my colleagues and myself that erythroblastosis is primarily a hæmolytic disease; but Rh iso-immunisation does not as yet supply the complete answer to all the problems presented by that disease, though it has opened fresh avenues of research. I shall only discuss hæmorrhagic and hæmolytic disease briefly in relation to prematurity.

Death is often due to more than one of the four main causes and to any one or any combination of the four.

For instance, a precipitate labour, often the result of prematurity, renders a baby liable to intracranial hæmorrhage which, in its turn, may produce asphyxia; furthermore, the premature child is particularly prone to contract infection. Intracranial hæmorrhage from birth injury is usually fatal; but asphyxia also may produce changes, including hæmorrhage, in the central nervous system which may be fatal, or from which the child may recover completely or ultimately develop spastic diplegia, epilepsy or mental deficiency. Hence, in the diagnosis of the cause of cerebral symptoms in the newborn it is wise to think of asphyxia and birth injury as one clinical syndrome.

* Being the first Charles West lecture, delivered before the Royal College of Physicians of London on Nov. 16, 1943.

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ASPHYXIA

Asphyxia, which is said to play some if not the chief part in 50 % of neonatal deaths, is present in some degree in every neonate. In fatal cases widespread venous congestion and hæmorrhages are found in the brain, lungs, thymus, heart muscle, kidneys and elsewhere, and just as cerebral symptoms may be the characteristic clinical feature of asphyxia, so sometimes pulmonary symptoms may predominate and the picture be one of atelectasis. Like a convulsion, a rigor, vomiting or diarrhœa, asphyxia is only a symptom; and in an attempt to determine its causes help can be obtained from the fascinating investigations on fœtal, natal and postnatal respiration by Barcroft (1942) and his colleagues.

The oxygen of the fœtus is both at a lower tension and less in reserve than in the adult and therefore there is a smaller margin of safety. To counterbalance this the fœtus not only has a special form of hæmoglobin but towards the end of pregnancy its hæmoglobin and red cells reach a higher level than required in extra-uterine life. In effect, the fœtus is in a condition of partial anoxæmia and cannot stand any great increase of anoxæmia at birth; moreover, the lung alveoli are adherent, so that a rather considerable effort is necessary to aerate them. If there is any sudden interruption or disturbance of the uterus-placenta-cord system the fœtal heart rate increases and the fœtus makes gasping movements, the significance of which has been made clear by Barcroft's experiments. Previously it was thought that the fœtus was born in a state of physiological apnœa, with the result that carbon dioxide accumulated, stimulating the respiratory centre; now some authorities believe that the respiratory movements seen in the sheep embryo when the cord is occluded occur normally in the latter third of human fœtal life and that extra-uterine respiration is not a new but a continuation of an existing function.

The question is often asked whether asphyxia is due to oxygen want or CO_2 excess or a combination of the two. Experimentally the respirations of oxygen want are of rather a different type from those of CO_2 excess often being gasps and part of a more extensive muscular movement; it seems likely, therefore, that the gasp given by a fœtus in poor condition is due to oxygen want, whereas in a lively fœtus both oxygen want and CO_2 excess play a part when the cord is tied.

The normal relative anoxæmia of the fœtus is increased by certain conditions which Barcroft has classified as "anoxic," "anæmic" and "stagnant" and to which Peters and Van Slyke have added a fourth variety "histiotoxic."

Anoxic anoxæmia is produced by anything which disturbs the efficiency of the mother's respiration or circulation. Anæmic anoxæmia occurs when the mother is anæmic and also in erythroblastosis fœtalis. Stagnant anoxæmia is produced by knots in the umbilical cord or by cardiac failure in the mother; and the fourth variety, histiotoxic anoxæmia, occurs when drugs, anæsthetics or disease lower the functional activity of the cells of the respiratory centre and of the tissues.

These four varieties are usually mixed and not clearly cut; thus histiotoxic anoxæmia is likely to occur both in anoxic and anæmic anoxæmia. Moreover, some forms of anoxæmia continue after birth; thus, anything preventing proper respiratory interchange such as aspiration of mucus or amniotic fluid will produce anoxic anoxæmia and anæmic anoxæmia may result from hæmolytic disease of the newborn.

Lund (1942) regards the misuse of anæsthetics as one of the more important causes of asphyxia.

When properly administered and used as analgesic agents the anæsthetics he investigated did not materially influence its incidence; when, however, they were used in concentrations sufficient to produce anæsthesia for operative delivery, the incidence of asphyxia increased and varied directly with the duration of anæsthesia. The important thing in producing asphyxia is not the anæsthetic but its combination with other possibly even more important factors such as prematurity and the complications of pregnancy and labour.

The causes of asphyxia which act in the antenatal and natal periods are obviously more important and more numerous than those which act in the neonatal period. Furthermore, asphyxia is often due to more than one cause—for instance, immaturity, birth injury, suffocation from inhalation of liquor amnii, hæmolytic or other congenital disease, maternal disease, the effects of administration of sedatives and of certain drugs, such as sulphonamides, to the mother might all affect the same child. Such a formidable combination is improbable but not impossible; hence, without an autopsy, certification of asphyxia as a cause of death is futile.

In the treatment of asphyxia there is a division of opinion as to whether pure oxygen or oxygen containing a small percentage of CO_2 should be used. We have seen that a definite effort is necessary to expand the lungs and to separate adherent alveoli in order to draw the first breath; in asphyxia an even greater effort is necessary, because the lungs are then wet and sodden. Pure oxygen is said to be useless in overcoming this atelectasis because it is absorbed in a few seconds and the lung collapses again. Barcroft states that the admixture of a certain amount of nitrogen may prevent this collapse, but that the addition of CO_2 is pointless since the newborn fœtus is overloaded with carbonic acid; when, however, the respiratory rhythm has been established CO_2 should be administered with oxygen.

In the present state of knowledge certain causes of asphyxia cannot be removed, but with greater supervision of the mother during pregnancy, improvement in obstetrics, increased appreciation of the possible untoward effects of drugs, anæsthetics and sedatives and a greater care of the newborn infant, no one can doubt that the lives of many infants would be saved.

BIRTH INJURY

Intracranial birth injury and asphyxia associated with cerebral symptoms should be regarded as one syndrome to which prematurity is often a predisposing cause. Birth injuries of some form or other are so numerous that the wonder surely is not how many babies are injured but how many are born intact. Injuries to the brain, spinal cord and abdominal viscera are usually fatal, while peripheral nerve injuries and fractures of the long bones are relatively common causes of neonatal morbidity. The most important fatal injuries are those to the brain and "considering the peculiar liability of the head to injury it seems, at first thought, strange that it should act as the battering ram by which the fœtus forces its way into the world" (Holland 1937)—though paradoxically this approach is fraught with far less danger to the brain than when the head comes last.

Eardley Holland has explained the way in which the dura is torn as the result of excessive stress and also how the veins of Galen become engorged from kinking, which produces progressive venous stasis and eventually rupture of the main vein or its branches even before the stress has been sufficient to produce a dural tear. Before such a rupture of the Galenic system, the area drained is in a state of what he calls "traumatic cerebral asphyxia," and engorgement of the cerebral veins may also arise from general asphyxia. Schwartz (1927) stated that there is evidence of microscopical or naked-eye hæmorrhage or their sequels in the brains of approximately 95% of infants who die in the early weeks of life. The interpretation placed by Schwartz upon these changes—which are chiefly situated in the central white matter and basal ganglia and are relatively uncommon in the cortical area—has been challenged. Many of the sequelæ which he ascribes to small traumatic hæmorrhages have been attributed to asphyxia (Schreiber 1940), and in some cases of sepsis of the newborn similar changes have been described by Virchow (1867) as interstitial encephalitis; findings which have recently been confirmed by Baar (1937).

In company with other pædiatricians, I have attributed many forms of mental backwardness, convulsions and cerebral palsies to intracranial hæmorrhage from birth injuries; but reconsideration has convinced me that this is a mistaken view and that an intracranial hæmorrhage is usually catastrophic; moreover, in the newborn a few red cells in the CSF, or even its yellow discoloration, cannot be accepted as a proof of cerebral hæmorrhage. I now believe that many of these manifestations are due to "traumatic cerebral asphyxia" or to general asphyxia. In a recent review, Wyllie has made it abundantly clear that in the present state of our knowledge this position is correct.

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He writes:

"It is probable . . . that all cases of severe intracranial hæmorrhage at birth prove fatal within a few days. It can be assumed that purely subarachnoid bleeding is the least likely to cause death and that intracerebral hæmorrhage, especially petechiæ from primary or secondary asphyxia, is the second commonest form of hæmorrhage compatible with life. It must be constantly reiterated that even if the subject of gross bleeding survives the original hæmorrhage this is not the sole lesion; primary and secondary asphyxia . . . will provide multiple lesions on which many of the paralytic symptoms will ultimately depend.".

Some authorities believe that intracranial hæmorrhage may be due to hæmorrhagic disease of the newborn, but most British pædiatricians do not agree, though they admit that it may influence the extent and persistence of the hæmorrhage. Hæmorrhagic disease is due to an increase in the physiological hypoprothrombinæmia of the newborn and can be prevented by administering vitamin K either to the baby or to the mother before or directly after the start of labour. The work of Sanford and his colleagues (1942) has been quoted against this view since in a study of 1600 cases they found that the administration of vitamin K to the baby or to the mother before birth raised the prothrombin level but did not affect the incidence of the hæmorrhagic manifestations. Actually their series is too small to enable definite conclusions to be drawn because of the relative rarity of hæmorrhagic disease in the newborn. Everyone, however, is agreed that a blood-transfusion given to the baby raises the prothrombin level and arrests the hæmorrhage. It is also worthy of note that on rare occasions hæmorrhagic disease may be due to fibrinopenia (Allibone and Baar 1943) and also to a functional deficiency of platelets without thrombocytopenia (Baar 1941).

The prevention of birth injuries obviously belongs to the sphere of obstetrics and it is interesting to note that chiefly by the increased use of diagnostic X-rays D'Esopo and Marchetti (1942) in the years 1938 to 1940 halved their fœtal death-rate of the previous three years from this cause.

PREMATURITY

The reports of the United States Bureau of the Census give prematurity as a single cause of death in 47% of neonatal deaths—a statement which conflicts with the figures already given for large series of autopsies both in America and this country. The importance of prematurity may perhaps best be expressed—possibly this is the sense in which the bureau figure is to be taken—by saying that a certain percentage of neonatal deaths occurred among premature infants; thus, for instance, in Birmingham in the four years 1938–41 there were 70,402 live-births and 54% of the neonatal deaths were of premature infants.

Prematurity is said to be present in about 10% of live-births. In the Birmingham series it formed only 5% of the live but 40% of the stillbirths. Since so many premature children are, in the words of Job, "carried from the womb to the grave," it is important to correlate the pathological causes of premature live and premature stillbirths.

Such an investigation has been carried out by Agnes Macgregor (McNeil 1942), who found that in 283 autopsies on premature infants and stillbirths, the commonest cause of death was asphyxia, whereas prematurity itself was only responsible for 33 cases; even this figure is probably too large since no attempt was made to determine whether any of the still or premature births were due to hæmolysis following iso-immunisation. The risk of infection is even greater in the premature than in the full-term child, and in this series infection ranked second only to asphyxia as the main cause of death.

The problem of prematurity is clearly twofold, comprising, first, the care of the premature infant and, secondly, the prevention of the condition.

The mortality of premature infants is variable, being, for instance, less than 10% in some Chicago hospitals and rising to 70 in others. In Birmingham Mary Crosse (1943) reports a mortality-rate of 38% in what, I believe, is the largest series collected in this country—2332 cases. Though she has by no means solved the problem of the care of the premature infant, she has made a considerable contribution to it since 76% of the babies over 3 lb. in weight survived and 92% of these survived their first birthday; moreover, nearly half the babies treated were between 3 and 4 lb. in weight. Good as these results are, they have been outclassed by those obtained by Barnes and Wilson (1942) of Ann Arbor who, in two consecutive 5-year periods, reduced the mortality-rate of viable prematures from 32·5 to 9·5%. It is impossible on the evidence available to say how many of the babies were of low weight, but infants under 2 lb. (of whom there were 79 in the Birmingham series) were excluded. These writers believe that these results were due to "infinite patience and attention to minute detail" by members of the nursing staff, and to the use in the second period of "more and better incubators," increased doses of vitamins B and K, and the routine use of an oxygen tent or closed incubator for babies whose weight was under 4 lb.

Lamb (1939), another American writer, reduced a good mortality-rate of 27·07% for 314 cases to 8·33% for 120 cases in two consecutive periods. The latter group, like the second series of Barnes and Wilson, were nursed in special incubators. Lamb attributed this improvement to better obstetric technique, good keen nursing and the practice of "hands off" the infants.

The lowest figures known to me were achieved in a London hospital during this war, and over a period which included all the extensive air attacks.

In a group of 185 babies under the care of Elaine Field (1943) at University College Hospital the mortality-rate was 8·1%. When it is realised that these infants were delivered in overcrowded, hot and stuffy wards, lighted by artificial light; that they were nursed in a side room which also functioned as a sister's office and to which students, nurses and medical staff had free access, and that the degree of humidity was determined not by elaborate machinery but by the breath of the inmates, I think it will be agreed that it is difficult to praise adequately this superb medical and nursing effort.

The results were classified according to weights—the only accurate method of presenting these mortality statistics—and can be compared with the Birmingham figures. Probably the best comparison can be made by taking the mortality figures for children weighing 3–4 lb. (see table). Though the number of children in the two series is so disproportionate, Field's mortality-rate is much the better, 15·4% against 40%, and in the group 4–5 lb. the improvement is still greater, 1·8% compared with 22%, but it should be pointed out that all her cases were born in hospital, whereas some of the children in Crosse's series were admitted from their homes.

	DR. CROSSE		DR. FIELD	
Weight (lb.)	Cases	Mortality (%)	Cases	Mortality (%)
Under 2 ..	79	97	5	100
2–3 ..	347	73	8	62·5
3–4 ..	832	40	26	15·4
4–5 ..	865	22	55	1·8
5–6 ..	209	6	91	0

Field attributes her results to three things: a high standard of nursing; the use of breast milk; the minimum handling of the infant. If breathing were poor or blue attacks occurred, oxygen with 5% CO_2 was given nasally. Temperatures were not taken since it was known that if the electric blankets were kept at "low" on the thermostat, a temperature of approximately 99° F. was produced. No-one except the doctor and the nurse touched the infants; masks and gowns were worn by the nurse but rarely by the medical staff.

If incubators are used in the treatment of prematures the humidity should be kept at 55–65% saturation and the temperature must depend on that of the baby. It is generally accepted that while at first food should not be forced high calorie feeding is indicated later, since the paramount thing at first is to maintain life not to achieve spectacular gains in weight. I like Tow's (1942) dictum: "The premature infant is not a balloon that should be blown up."

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There is no general agreement on the type of food which should be given, but I agree with Elaine Field that breast milk is the best food, although there is no reliable statistical evidence to support this view, nor, indeed, to show the results of any system of feeding. Investigations are needed to elucidate this point. Collis believes that the administration of thyroid is beneficial to the premature baby, but the evidence in support of this and of the value of œstrogens is unconvincing. Vitamins, particularly vitamin K, should be given early and in adequate quantities because hypoprothrombinæmia is more severe, lasts longer, and the liability to hæmorrhagic disease is therefore greater in premature than in mature babies. Since there is little or no storage of vitamin K in the body and we know that hypoprothrombinæmia occurs in liver disease, it is probable that this condition is due to defective liver function, itself the result of prematurity. In the newborn full-term child the period of physiological hypoprothrombinæmia lasts from the second to the fifth day of life and can be prevented by giving vitamin K to the mother before or at the start of labour, or to the child, or by giving the latter cow's milk feeds directly after birth until the breast milk flow is established—methods which are also applicable in prematurity.

The newborn premature infant is also more prone to develop œdema and to show more prolonged and deeper jaudice than the full-term child. The probable explanation of the tendency to œdema lies in the fact that not only have premature infants a lower urea clearance than full-term infants, but their sodium and chloride clearances are even more reduced (Young et al. 1941). A satisfactory explanation of the jaundice has never been forthcoming, but since it is known that miscarriages and premature labours are common in the obstetric histories of the mothers of infants suffering from hæmolytic disease of the newborn, I would suggest that both the jaundice and the prematurity, and possibly sometimes the œdema, may be due to hæmolytic disease.

Except that air-conditioned rooms were not used, the technique of the American writers quoted above represents the most advanced form of treatment of premature babies and contrasts with the simple methods adopted by Crosse and Field. All, however, agree in stressing the importance of rigid attention to nursing and other details and the avoidance of infection. There are three particular danger periods in prematurity: during the first 24 hours, in which two-thirds of the deaths occur; in the second week when feeding is particularly difficult; and in the later periods when the danger from infection is greatest.

Skilled nursing will produce good results with a simple regime; without it, incubators, humidifiers, air-conditioned rooms with oxygen on tap will all be unavailing. Hess, to whom is largely due the great improvement in the care of premature children in America, has organised in Chicago a city-wide plan for dealing with prematures; and I would strongly endorse the suggestion made recently in the *Lancet* (1943, ii, 81) for the establishment of an organisation for the care of prematures on the lines of obstetric "flying squads."

The great predisposing cause of prematurity is the health of the mother and in particular the occurrence of toxæmia of pregnancy; its prevention, like that of birth injury, is therefore largely an obstetric problem.

Baird (1942) found that it was impossible to assign a cause in two-fifths of the cases of prematurity; but facts about its social incidence were interesting. Thus, whereas the incidence of premature labour was about 9% among "booked" hospital cases from the working-class community in Aberdeen, and 6% in the upper and middle classes, it was only 2% among "booked" specialist cases. Incidentally, despite the fact that the mothers in the first group were given good obstetric care in hospital, the neonatal mortality and the stillbirth rate of the three groups showed the same trends; moreover, in the specialist cases there was relatively little pre-eclampsia, few cases of contracted pelvis and little anæmia or malnutrition.

Other factors, such as the relative numbers of primipara and multipara and the domestic assistance available in each class, should of course be considered, but Baird's deduction that the diet of the mother is the probable cause of these differences seems incontrovertible. There is not, as he points out, a great deal of direct evidence of the effect of malnutrition on the human offspring, although there is a considerable amount of evidence in experimental animals. Some years ago we showed that iron-deficient anæmic rats gave birth to offspring having an iron-deficiency anæmia, and that the administration of iron to pregnant mothers diminished the liability to nutritional anæmia in their babies. Davidson's observation that the intake of iron among the women of the poorer classes in Aberdeen is far below the normal, adds weight to Baird's suggestion.

Experiments have been carried out in South Wales, Oslo, Toronto and by the People's League of Health (1942) in London to test the effect of maternal diet on prematurity and neonatal deaths. Some people have thought the Toronto results point the way to an almost complete abolition of infant mortality, whereas others have suggested that the work is not beyond statistical reproach because of the small number of mothers investigated and the absence of adequate controls.

Ebbs and Tisdall, whose clinical ability I know to be of the highest order, were responsible for the greater part of this work and concluded that the raising of a "poor" diet to the standard of a "good" diet materially reduced the prematurity and stillbirth rates and produced better babies (Ebbs et al. 1941). The series was however small and should be repeated with larger numbers. The London experiment was not open to this objection. Over 5000 women were taken from the antenatal departments of ten London hospitals, half of them, chosen alternately, being used as controls, and the others being given additional supplements of calcium, iron, iodine and vitamins A, B, C and D. The incidence of toxæmia of pregnancy was 30% and the prematurity rate 17% less in the supplemented than in the control group. These results have also been criticised because they are based on the definition of prematurity as birth before the 40th week of gestation and not on weight.

Field seems to have proved that skilled pædiatricians can almost solve the problems of the premature infant, but the available evidence shows that an improvement in the nutrition, social conditions and general health of expectant mothers will diminish the premature birth-rate, and that the close coöperation of obstetricians with pædiatricians who have had experience of neonatal conditions is essential for the adequate treatment of prematurity.

INFECTION

Much disease and many deaths in the neonatal period are due to acute infections; moreover, the clinical picture produced is so entirely different from that usually associated with an acute infective illness that it may pass unrecognised by doctors, nurses and pædiatricians without special experience. In adults and older children an infection may produce a purely local manifestation; but in infants not only does it tend to be generalised but their lack of resistance is so great that the illness may be afebrile, and even prove fatal within 24 hours. Though the defensive mechanism of the newborn baby is so slight, there is often, but not invariably, a considerable degree of immunity to the common infectious fevers, due to the transference of immune bodies from the mother.

Spence (1941) has pointed out that in the infections of infancy the causative organism is difficult to recover and the pattern of the illness so variable as to give little help in diagnosis; thus, a Flexner infection may cause an acute generalised toxæmia in one infant, meningitis in another and dysentery in a third. When an acute infective illness arises in epidemic form in an institution it may readily be recognised. The initial or isolated case is, however, difficult to diagnose, although it should be suspected whenever a young baby shows unusual drowsiness or unusual peevishness and a disinclination or refusal to feed; indeed, according to Cameron the newly born child functions only as a suction apparatus, and any diminution of this power is a most important symptom of ill health. These symptoms may be accompanied by diarrhœa and at the height of the illness the respirations may be rapid and panting in character. The child soon becomes limp and apathetic, the cry feeble and whimpering, the skin pale and sallow, the eyes sunken and convulsions may terminate the illness which, as stated, may only last for a few hours. Sometimes the illness is of longer duration and the child

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wastes; in fact any child who in the neonatal period loses its appetite and also loses weight is almost certainly suffering from sepsis neonatorum.

The newborn baby must always be handled with the greatest care because the skin and the mucous membrane of the mouth are extremely susceptible to injury and, together with the respiratory tract, umbilicus and alimentary tract, are common sites for the entrance of infection. Infections of the skin are usually due to the staphylococcus and though subcutaneous abscesses and mastitis may develop, the most important manifestations are the varieties of pemphigus, which range from a few isolated and unimportant blebs to severe and often fatal exfoliative dermatitis. The milder forms of this infection are more common now than in prewar years, for which various reasons have been advanced.

Thus it is stated that—possibly because of the black-out or of an increase in dust—the nasopharyngeal flora of nurses has completely changed, the preponderating organism now being the staphylococcus, and that it is not the hands of the nurse but her nose which is the usual source of infection. During the peak of a recent hospital epidemic (Benians 1943) the nasal carrier rate for staphylococci amongst the nursing and medical staff reached 85%; furthermore, infant "contacts" often become skin and nasal carriers of the staphylococcus, and according to Eardley Holland these nasal carriers are the cause of maternal mastitis and breast abscess. Other possible sources of infection in pemphigus are dirty and scabies-infected mothers, infected soap and soiled blankets. These skin infections form only one of a whole series of manifestations of the staphylococcal infection of the newborn which indeed provides an excellent example of the great variety of disease conditions that may result from infection with one organism. In addition to the skin manifestations, it may produce a sudden fatal septicæmia, a meningitis, gastro-enteritis, pneumonia or a relatively benign osteomyelitis (Cass 1940).

There is always a grave risk of the spread of any umbilical infection to the liver, the abdomen and the blood-stream with the consequent development of pneumonia, meningitis, &c. Fatal infections of this type are commoner than they should be: they may arise even when the umbilicus is apparently healthy; they should always be suspected when, in addition to the general signs of sepsis neonatorum, there is any distention of the abdomen or of the veins of the abdominal wall. Infection of the umbilical veins is probably always fatal and such infection can only be prevented by scrupulous cleanliness in dealing with the cord and the prompt treatment of any sign of infection of the umbilicus.

The upper respiratory tract of the newborn is peculiarly liable to infection. This is particularly dangerous because of the possibility of extension to the sinuses and lungs, and it is often associated with diarrhœa and vomiting. The importance of pneumonia as a cause of neonatal death is not generally appreciated owing, doubtless, to the difficulties in making a diagnosis, and in recognising the post-mortem lesions; moreover, like other neonatal diseases, pneumonia, though an important factor, may not be the sole cause of death.

In a study of 541 consecutive necropsies on stillborn children and children who died in the neonatal period, Agnes Macgregor (1939) found inflammatory changes in the lungs in 177, 166 of which were live-births; of the children born alive, more than a quarter developed pneumonia in the first 2 days and over half in the first week and nearly half were immature babies. In the stillborn infants and those who lived less than 12 hours and also in a large proportion of those who lived 3 to 4 days, the pneumonia was associated with, and probably due to, the irritant effect of the aspiration of an excessive quantity of liquor amnii; an indication that it developed before birth and that the aspiration was probably due to intra-uterine asphyxia. Intra-uterine asphyxia was also directly responsible for those cases in which pneumonia was associated with atelectasis without any evidence of aspiration. Bacterial infection before birth was found to be uncommon but was disastrous when it did occur. On the other hand, the conditions produced in the lungs by asphyxia were favourable to bacterial invasion after birth. When pneumonia developed more than 2–3 days after birth it was either part of a general infection or, more often, the result of respiratory tract infections. A few of the latter group showed evidence of post-natal aspiration pneumonia but, in most, the pneumonia was due to air-borne infection and was the direct cause of death.

The diagnosis of pneumonia in the neonatal period is not easy, but even in the absence of physical signs and any appreciable pyrexia, may confidently be made in the presence of an upper respiratory tract infection, an increased respiratory rate and pneumonic breathing, especially if accompanied by cough. The prognosis is always extremely grave, though the introduction of sulphonamides has improved it. The neonatal morbidity and mortality from respiratory infections may be greatly reduced by constant exercise of care: the elimination from the nursery of all with known respiratory and oral infections; the abolition of visitors or their reduction to a minimum; and the efficient masking of the nurses and doctors, and of mothers when nursing their infants.

The other great portal of entry is the alimentary tract; indeed, infective gastro-enteritis, which is commoner in bottle- than in breast-fed babies, has been claimed as "the most lethal of all the commoner neonatal infections" (Henderson 1943). Cases may occur sporadically in hospitals but occasional epidemics are more usual. Outbreaks due to organisms of the dysentery group have been described but, as a rule, the causal organism is not discovered, and some authorities have suggested that it may be a virus disease, although the favourable results of sulphaguanidine therapy do not entirely support that suggestion. The sudden loss of appetite as an initial sign is, perhaps, more noticeable than in other infections. The course is a rapid one, diarrhœa is severe, much fluid is lost, and within a few hours there is great dehydration. Vomiting may be present and although fever is often absent it is perhaps commoner than in other infective diseases, possibly as a result of dehydration. The outlook is grave, but a striking improvement in the prognosis has been produced by the therapeutic use of sulphaguanidine.

The disease is undoubtedly spread by lack of care. The patients should, therefore, be isolated and the greatest care taken in the preparation of any artificial feeds. The nurse who changes the baby should not prepare its food and it is better that she should not administer it.

Parenteral diarrhœa is particularly associated with upper respiratory tract infections, but may complicate pneumonia and pyelitis. Conversely pyelitis, which is among the more important neonatal infections, may be a complication of an alimentary infection.

In view of the increased incidence of venereal disease, the importance of syphilitic infection as a cause of neonatal disease should be stressed, especially as according to Nabarro its manifestations are sometimes so half-hearted as to deceive even the very elect. Deaths from syphilis formed 1·27% of the autopsies at the Children's Hospital, Birmingham, and less than 1% in Cruickshank's series. Intra-uterine infection with syphilis and tuberculosis has long been recognised, but recently Douglas and Stander (1943) have produced evidence that the fœtus may acquire septicæmia in like manner.

In recent years, and particularly during the period of the war, there has been a growing demand for institutional midwifery which is likely to continue after the war and probably to increase; indeed, it is estimated that 50–80% of pregnant women will wish to be delivered in hospitals and maternity homes. Prevention of infection is, therefore, an institutional problem and unfortunately the risk of contracting an acute infective illness is much greater in an institution than in the home. I have been impressed by the poverty of much of the accommodation provided for the newborn baby even in modern hospitals. There is rarely any effort to provide proper spacing of the cots; indeed, sometimes these are made up in batteries of from 5–8 cribs placed cheek by jowl and located in any hastily improvised side room or bathroom. Nurses are by no means always masked, and though breast-feeding is far from universal milk kitchens are rare. In some hospitals there is inadequate supervision of visitors to the nursery; indeed, in some public assistance institutions the "aged and infirm" inmates help with the nursing, a kindly action on their part and no doubt some relief to their monotonous existence but fraught with dangerous possibilities for the babies. It is only fair, however, to say that one of the most charming, well-run and well-spaced

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nurseries that I have seen is situated in an ancient public assistance institution in a small country town.

The British Pædiatric Association has recently published ideal suggestions for the management of babies in maternity hospitals among which are the following:—

Every mother should be in a separate cubicle large enough to accommodate her and her baby; these cubicles should be grouped into wards of 8–12. The walls between adjacent cubicles should be glass so as to prevent the feeling of isolation, and each cubicle should contain adequate equipment for the nursing care of the child. There should also be separate cubicle accommodation for infants who have to be removed from the mother's cubicle because of crying, illness of the mother or of the child, bad congenital deformities, &c.

The quarters for sick babies in many general hospitals and public assistance institutions are little better than those provided for the newborn babies in maternity departments. There is often gross overcrowding and a lack of efficient barrier nursing. The newborn infant becomes an inpatient either because an infective illness has already been contracted or for some other neonatal condition which it is important should not be complicated by an infection. At my own hospital the problem has been tackled by the provision of a cubicle system housed in a special building. A separate air-conditioned premature unit with oxygen and CO_2 laid on to the cubicles is also provided, but has not yet been brought into use. Breast-feeding is encouraged, artificial feeds are made in a milk kitchen, and the babies are taken from their cots for feeding purposes. Inside the ordinary napkins there is a cotton-wool and gauze pad. When the napkin is removed the pad is removed by forceps and it and the napkin are placed in separate utensils. The napkin is transferred to a bin containing antiseptic and later sent to the laundry. The pad is put into an incinerator in the sluice room. Nurses are told to report diarrhœa, colds, sore throats, sore fingers, and are then excluded from duty in this block until they have recovered. For this reason, the nature of the work and the Rushcliffe report, these wards require a large nursing staff, and so far we have not been able to have as many nurses as I would like. The nursing staff is particularly keen on the work, but, even so, it is essential that both they and the medical staff—resident and visiting—should be "kept up to scratch." For this purpose we have just appointed a specially skilled senior resident to take supreme control of all the beds. I cannot pretend that infection has been completely eradicated, but in the four months June–September of this year, 57 infants died, and in only 3 of these was there post-mortem evidence of an infection which might have been contracted in hospital; 2 of these 3 infants suffered from hæmolytic disease which may well have been the real cause of death.

Conclusions

The advisability of attempts to keep alive many of the children about whom I have been talking has often been called in question; but as pointed out by Collis a greater saving of life can take place at this period than at any other, and most premature children who survive become normal children. Actually it is not unusual for premature infants eventually to show more than average mentality, and instances of great men who were prematurely born are well known to everyone—Voltaire, Rousseau, Victor Hugo, Isaac Newton and Winston Spencer Churchill (Morton 1943). The reason for the premature birth of the last may be that given by one of my colleagues, "He could do as much in seven months as the rest of us could do in nine."

Investigations into neonatal disease and death which have been and are being carried out hold great promise for the future, but to attain the object we have in view the following are absolutely essential requirements: a realisation of the national importance of the preservation of child life; greater care of the expectant mother; better undergraduate and postgraduate instruction for medical students and nurses; a good obstetric service; facilities for the adequate training of pædiatricians and their employment in obstetric units. An idea of what can be achieved, even at present, by an institutional midwife service subject to a degree of expert inspection is shown by the results obtained in one reception area in which, from the outbreak of war until the end of 1942, there were 11,241 confinements with a stillbirth rate of 17·2 per 1000 births, and a death-rate, during the first two weeks of life, of 5·8 per 1000 live-births. In other words in these homes the stillbirth rate was half and the mortality-rate a quarter of the average yearly rates in the last five years for England and Wales (35·76 and 23·89). In making these comparisons, however, it should be stated that the evacuee mothers left their homes one month before the expected dates of their confinements, that they had all received some antenatal care, and that abnormal cases were not evacuated. In spite of these considerations it is obvious that if similar results were obtained throughout the country thousands of infants' lives would be saved annually. Good as these results are they could be even better if greater attention were devoted to the care of the infant.

Over twenty years ago Eardley Holland concluded his report on fœtal death thus, "the most urgent reform of all, the improved training of doctors, has still to come. Fœtal mortality is not likely to fall until their standard of midwifery skill is raised." If the last sentence is altered so as to read, "Fœtal and neonatal mortality are not likely to fall until their standard of midwifery and pædiatric skill is raised," the royal road to the prevention of neonatal disease and death is clearly indicated.

Pædiatrics is not a specialty but general medicine applied to a special age-period. It is, therefore, a prime concern of this College which can do much to further its study. The founding of this lectureship, the award of the Moxon Medal to a pædiatrician and the recent appointment of a committee to inquire into the teaching and other aspects of pædiatrics are welcome indications that the College realises the increasing educational and national importance of this subject.

Although visions are the prerogative of youth and old men usually have to be content with dreams, sometimes in their dreamy contemplations old men renew their youth and then visions may replace their dreams. Some such experience has fallen to my lot; I do not claim that my vision is a new one, indeed it was described over two thousand years ago in these words, "the streets of the city shall be full of boys and girls playing in the streets thereof"; but its fulfilment can be brought much nearer if the suggestions made in this lecture are carried out; by so doing many children "whose glorious beauty is" now "a fading flower" will be saved from disease and death and their parents given "beauty for ashes, the oil of joy for mourning, the garment of praise for the spirit of heaviness."

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PROLONGED POST-TRAUMATIC AMNESIA[1]

FINDINGS AT OPERATION

ADAMS A. MCCONNELL, M B DUBL, F R C S I
SENIOR SURGEON, RICHMOND HOSPITAL, DUBLIN

THE term "amnesia" as generally used includes loss of retention of memory, inability to recall recent events, confusion and confabulation. Its manifestations are seen in toxic and degenerative states, and in metabolic and purely psychological disorders, as well as after concussion. A search of the modern literature on closed head injuries has failed to disclose a single reference to an operation performed solely because amnesia was lasting too long after a cerebral concussion. The following cases thus possess the virtue of novelty.

In a series of 53 cases of concussion, clinically uncomplicated, there were 5—and only 5—in which amnesia lasted without any sign of improvement for more than four days. To these I have added one case encountered 13 years ago. The facts about these cases can be presented most clearly and shortly by charting the clinical course of case 6, the most recent of them (see figure).

This patient became "accessible"—that is, he could give his name, obey commands, and attempt to answer questions—in 4½ hours. He remained amnesic and severely confused for 6 days. He was then operated on. He became less confused but amnesia persisted for a further period of 21 days when continuous memory was restored.

The line representing the course of consciousness was essentially the same in this and the other patients though the duration of amnesia is different in each case (table I).

TABLE I—POST-TRAUMATIC AMNESIA IN 6 CASES

Case	Inaccessible period	Amnesic confusion	Duration of post-traumatic amnesia	
			Before op.	After op.
1	..	Severe	66 days	4 days
2	..	Moderate	11 days	4 days
3	..	Moderate	21 days	7 days*
4	3 days	Severe	9 days	5 days
5	..	Severe	14 days	6 months
6	4½ hours	Severe	6 days	21 days

* Died of pneumonia

An accurate record of the duration of the inaccessible period was obtainable in 2 cases only. All the patients had been accessible for some days before the operation and there was no anxiety about the survival of any of them. The criteria used in diagnosing confusion as "mild," "moderate" or "severe" are those laid down in the MRC War Memorandum, No. 4 (1941).

The operation consisted of making a single burr hole, 1 cm. in diameter, on each side of the skull and of opening the dura mater.

In case 5 operation 14 days after the accident did not reveal any abnormality inside the skull. The state of severe confusion continued and the patient was admitted to a mental home. It was reported that he recovered his memory inside 6 months and that his confusion passed away a month later; 8 months after the accident he was free from symptoms and was doing his original work satisfactorily.

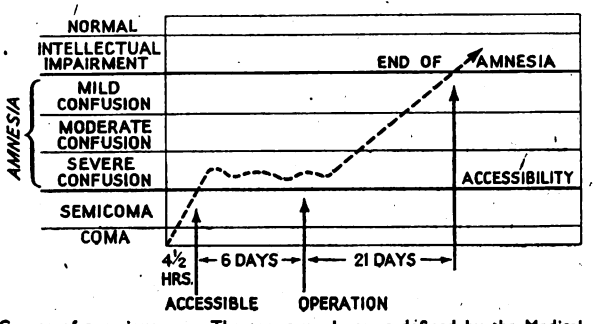
When the dura was opened in the other 5 cases a quantity of fluid escaped from the *subdural* space and the brain remained 1–2 cm. deep to the dura. In one case the fluid spurted out; in the others tension seemed to be slight. The arachnoid membrane was intact at the area exposed and there was no sign of an excess of subarachnoid fluid. Table II indicates the character of the fluid obtained. These collections of fluid are beyond question pathological. The term "subdural effusion" has been used to indicate their position.

One patient became more rational but died of pneumonia 7 days after the operation; the rest recovered completely. Case 6 is reported fully at the end of this paper.

1. Read before the Society of British Neurological Surgeons, May 8, 1943.

ARGUMENT

The first patient was operated on in January, 1930, on the supposition that he might have an intracranial hæmorrhage. This hope was based on the presence of a fracture traversing the grooves of the meningeal vessels. Hæmorrhage was not found, but a subdural effusion was discovered. The lesson taught by this case was not learned until collateral evidence proved that subdural effusion was a lesion to be expected after head injury. During the last 3 years the diagnosis of a subdural effusion, based solely on the prolongation of amnesia, has been confirmed by operation in 4 out of 5 cases.



Course of consciousness. The terms used are as defined by the Medical Research Council (1941).

It is difficult to believe that a lesion which so definitely modifies the normal environment of the brain would not interfere in some way with the cerebral circulation and that such interference would not influence a brain recovering from concussion. The remark of Trotter (1930) that "the brain is the only organ in the body which must return to exactly its normal size before it can function normally" appears relevant. The brain cannot return to its normal size if some of the space it requires is occupied by fluid. This fluid cannot be removed by lumbar puncture and there is no evidence that it is ultimately absorbed.

An increase of intracranial pressure does not seem to be responsible for delayed recovery in these cases, for other cases with a much higher pressure after injury had but momentary amnesia. It is noteworthy that though the subdural fluid was under pressure, the pressure of the spinal fluid did not exceed 135 mm. of water in any case.

The probability that a subdural effusion superimposed on a brain after concussion would do some harm makes us examine the phenomena of concussion in these cases for any unusual feature. The only feature of the kind is the prolongation of amnesia. It is possible, therefore, to regard this prolongation *in these particular cases* as a symptom of the effusion.

TABLE II—CHARACTER OF SUBDURAL FLUID

Case	Side	Colour	Quantity	Protein (g./100 c.cm.)	
				Subdural	Lumbar
1	R.	Slightly bloodstained	Copious	..	..
2	R.	Clear	Few c.cm.	..	..
	L.	Yellow-brown	30 c.cm.	3·5	0·05
3	R.	None	..	..	..
	L.	Slightly turbid	Copious	..	0·02
4	R. } L.	Yellow	Copious	2·0	0·03
6	R.	Bloodstained	93 c.cm.	..	..
	L.	Yellow	200 c.cm.	1·8	0·03

JUSTIFICATION OF EXPLORATION

Since this lesion cannot be verified or removed except by opening the skull, it is necessary to inquire whether the prolongation of post-traumatic amnesia is of sufficiently serious import to justify an exploratory operation. If the patients who have suffered from a long period of amnesia usually make a complete recovery, an operation would not be justifiable and discussion of the subject would scarcely be worth while. That this is not the case at present is revealed by Symonds and Russell

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(1943), who state that 60% of patients who remained amnesic for more than 7 days were "totally invalided." Whatever this term means it implies that these patients were not as fit men as they had been. Such a disability rate would seem to justify even heroic surgery—a term which cannot be applied to the surgical procedure followed in my cases.

The operation is very unlikely to have a bad psychological effect on the patient; in my experience he does not remember an operation performed during the period of post-traumatic amnesia. Strict neurosurgical technique can make it impossible for him to know afterwards that his skull has ever been opened. When, therefore, the manifestations of amnesia persist on the same level for more than 5 or 6 days there is no obvious contraindication to an exploratory operation designed to exclude or confirm the presence of a subdural effusion.

I suggest that the sequence of events in these cases was as follows: concussion caused a lengthy period of amnesia; during this period a subdural effusion developed, interfered further with cerebral function and so prolonged the existing amnesia. The duration of amnesia may therefore be regarded as a measure of the sum of the effects of the initial cerebral injury plus the subsequent interference with cerebral function.

DISCUSSION

I think it is correct to say that a subdural effusion is not generally included among the pathological possibilities at an early stage after head injury. In fact the only extracerebral lesion commonly considered is a massive hæmorrhage, and when the signs and symptoms of hæmorrhage are absent the clinical picture is explained on the basis of the purely cerebral lesion of concussion. Published studies show that there is small excuse for overlooking the possibility of subdural effusions, for they have been found at every stage after head injury.

Cushing (1908) mentioned the possibility of finding a subdural effusion during the performance of a subtemporal decompression. Later authors have reported cases under titles indicating the diffuse or local distribution of the fluid—"subdural fluid accumulations" (Naffziger 1924, Cohen 1927); "subdural hygroma" (Scott 1940, Fay 1940); "subdural hydroma" (da Costa and Adson 1941, Peet 1940); "traumatic subdural effusions" (McConnell 1941).

The fluid is usually considered to be cerebrospinal fluid which has escaped into the subdural space through a tear in the arachnoid membrane and da Costa and Adson (1941) have demonstrated such a tear. Munro (1938) regards the fluid as a phase of a subdural hæmatoma. Heyl and Small (1941) attribute some of these collections to an increased permeability of the arachnoid. Whatever its origin the available evidence suggests that the subdural fluid is, or becomes, independent of the CSF; its protein content is higher (in 3 of my cases 60–70 times higher) and it is not removable by lumbar puncture; indeed, in case 4 it was demonstrated that the subdural fluid had accumulated in spite of repeated lumbar punctures.

It is the general opinion that the symptoms and signs of a subdural effusion are the same as those of a subdural hæmatoma (Russell Brain and Cairns 1928, Peet 1940, da Costa and Adson 1941). The outstanding fact, however, demonstrated by the cases reported in this paper is that a subdural effusion may be present without producing any of the symptoms or signs which suggest hæmorrhage. If the unwritten law forbidding operation save for hæmorrhage had been obeyed, the subdural effusions would not have been found.

Prolonged amnesia due to pure concussion.—Only in case 5 was fluid not found. It was therefore the only case of mine apparently conforming to a type described by Denny-Brown and Russell (1941)—the type where pure concussion has produced prolonged cerebral disturbance. Hence it seems incumbent on us to find out how often subdural fluid—rich in protein and coupled with a diminution of the brain-volume—accompanies a prolongation of amnesia. In dealing with a state so variously caused and influenced, we cannot afford to disregard the presence, on occasion, of such gross pathology. If the skull had not been opened in these cases we should have been content to think that the intrinsic lesion of cerebral concussion was the only lesion present; and we should have been wrong.

CASE-REPORT

Five of the cases referred to in this paper have been reported previously in a wider setting (McConnell 1941, 1942). The following is a recent case:

CASE 6.—A man, aged 42, fell off a bicycle on Dec. 7, 1942, at 2.30 PM. He was immediately unconscious. The doctor of a local hospital stated that he became accessible at 7 PM and that the left side appeared paralysed. Progress was reported as satisfactory until Dec. 10 when at 3 AM the patient became drowsy and the pulse-rate dropped to 44. At 7 PM he was moving all limbs. He was greatly confused but was able to answer some questions correctly. There were exaggerated reflexes on the left side and a left Babinski reflex. Pulse-rate 56. Dec. 11: severe confusion; obeyed some commands; very restless; admitted to Richmond Hospital. Dec. 12: incontinent of urine. Pulse-rate 70. Left Hoffman and Babinski reflexes were the only neurological signs. Blood-pressure 150/100 mm. Hg. Radiograms of skull: no lesion seen. Lumbar puncture: pressure 135 mm. water. Fluid bloodstained.

Operations.—Anæsthetic: bromethol, ether and procaine. On making the right temporal opening, about 90 c.cm. of bloodstained fluid escaped from subdural space. Brain shrunken and remained 1·5 cm. below dural level. On making left temporal opening, over 200 c.cm. of yellow fluid without blood poured out of dural opening. Brain shrunken as on opposite side. Both wounds drained. Dec. 13: patient accessible but severely confused; very restless. Doubtful left Babinski. Dec. 14: wounds reopened and the patient placed in Trendelenburg position; there was a free flow of yellow fluid from the wound on the left side. Dec. 16: moderate confusion; gave name and address; talked freely but irrationally. Wounds reopened. On the right side the brain was up to dural level and some bloodstained fluid escaped. There was a free flow of yellow fluid from left wound.

Further course.—Dec. 18: moderate confusion. Dec. 19: able to tell time. Dec. 28: still moderate confusion; only occasionally incontinent. Dec. 29: able to get up and behave normally but mildly confused. Jan. 1: confabulation; no memory of events of previous day. Jan. 2 (27th day after injury and 21st day after operation): great improvement; first evidence of return of continuous memory. Jan. 7: behaviour quiet and reasonable; euphoric and talkative; orientated for place and time; memory for remote events good, for recent events variable; sometimes corrected erroneous memories; retention and thinking capacity poor. Little effort to solve simple problems; apperception good for immediate recall but in a few minutes had forgotten chief facts. Knowledge of general events fair but some confusion of detail, probably due to failure of attention. Jan. 13: discharged. March 7: seemed to have made a complete recovery; had no recollection of having had an operation.

SUMMARY

Current neurological practice is in danger of assuming grave responsibility if it should fail, in certain cases of prolonged amnesia after cranial injury, to look for and make the fullest possible assessment of a gross and hitherto neglected finding—the presence of subdural fluid, associated with reduction in the volume of the brain.

POSTSCRIPT

Since this paper was submitted for publication a post-traumatic amnesia of nine weeks' duration has been found associated with a large subdural hæmatoma. There were no other symptoms or signs.

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HIPPURIC ACID LIVER-FUNCTION TEST DURING TREATMENT WITH ARSENICALS

R. W. RIDDELL
MRCS; MAJOR RAMC

T. E. ANDERSON
MD ABERD; MAJOR RAMC

IN patients under treatment for syphilis, jaundice is often the first sign of hepatic damage. It is known that the arsenicals are liver poisons and that jaundice may be a late result of their hepatotoxic action. Evidence of their earlier effects on liver function, before the onset of jaundice, would greatly assist the clinician, and it occurred to us that in these cases one of the first of the liver functions to fail is probably its detoxicating mechanism. The hippuric acid synthesis test provides a method of assessing this particular function, and we decided to carry out a series of tests on cases of syphilis undergoing arsenotherapy in a military hospital in order to establish: (1) whether impairment of the detoxicating function is directly proportional to the quantity of the arsenical; (2) whether failure of the detoxicating mechanism precedes the onset of clinical jaundice and the appearance of bile products in the urine by an interval sufficient to allow the clinician to modify treatment; and (3) whether the test is of value in assessing prognosis in postarsenical jaundice.

The merits of the various liver function tests have often been compared (Vaccaro 1935, Snell and Plunkett 1936, Yardumian and Rosenthal 1937, Boyce and McFetridge 1938, McArdle 1940, Cates 1941, Bassett et al. 1941, Rennie 1942, Mateer et al. 1942). These tests are generally unsatisfactory because significantly low results are obtained only with extensive damage of the liver—so great is the reserve of this organ. The hippuric acid test is exceptional since it is based on the synthesis of glycine by the liver, which mechanism has little reserve.

Quick's (1933) simpler clinical method consists in giving the patient 6 grammes sodium benzoate by mouth, collecting the total urine excreted during the following 4 hours, and estimating its hippuric acid content. The benzoate absorbed is "detoxicated" in the liver by union with glycine derived from the hepatic cells, and the hippuric acid so formed is excreted in the urine. Excretion of less than 2·5 g. hippuric acid (calculated as benzoic acid) may be regarded as suggesting deficient liver function. Thus a dual mechanism is investigated, the synthesis of glycine by the liver cells and its conjugation with benzoic acid to form hippuric acid. Data prepared by Probstein and Londe (1942) have shown that in the great majority of cases of diminished hepatic function the fault lay mainly in glycine production rather than in the conjugation process. Campbell (1942) has shown that the conjugation of glycine with benzoic acid is less than normal where the carbohydrate content of the liver is decreased; hence it should be recorded that every patient we investigated received 50 g. glucose orally before each arsenical injection. One criticism of the accuracy of the test when performed as above is that the excretion of hippuric acid bears a direct relation to the urinary volume (Snapper and Grunbaum 1924), and Machella et al. (1942) have suggested the introduction of a factor to allow for extreme variations in urinary volume. Any low result in our series was checked by a further test after 2 days; so the introduction of a compensatory factor was unnecessary.

The test has many practical advantages over other liver function tests. It is simple and inexpensive, and may be performed quickly and satisfactorily by orderlies with a minimum of technical training and little apparatus.

The toxic effects of sodium benzoate are gastric (nausea and vomiting) and nervous (tinnitus, headache and vertigo) (Quick 1931). Quick found that undesirable effects from repeated doses of sodium benzoate were negligible, even in patients with established liver damage. In view of its nitrogenous content, however, sodium benzoate should not be given to those with azotæmia, and in any case the results are often fallacious in such subjects. Albuminuria must always be excluded before the test.

TECHNIQUE OF TEST

The method adopted was the simple clinical method (Quick 1933) with slight modifications.

The patient was kept without food from 8 PM on the day before the test until breakfast (coffee and toast) the next morning. An hour later he was told to void completely and was then given a solution of 6 g. of sodium benzoate in about 50 c.cm. of water flavoured with oil of peppermint, followed by 150 c.cm. of water. All the urine passed during the next 4 hours was collected and its volume recorded; where delay in transit to the laboratory was likely, toluene was added as a preservative. When the volume exceeded 250 c.cm. the 4-hour sample was slightly acidified with acetic acid, and evaporated down to a final volume of about 100 c.cm., which was recorded. The 4-hour specimen was then transferred to a 500 c.cm. conical flask and acidified with concentrated hydrochloric acid. For a urine volume of 200 c.cm. or less, 4 c.cm. of concentrated acid was added, with a further 1 c.cm. for every additional 50 c.cm. of urine. Precipitation of hippuric acid crystals began immediately on stirring and scraping the inside of the flask with a rod. When the flask had stood aside at room temperature for about 3 hours, the contents were sucked through a filter paper on a Buchner funnel. Excessive frothing of the filtrate in the Buchner flask was prevented by adding 3 or 4 drops of caprylic alcohol. The remaining precipitate was washed from the flask with a little of the filtrate and excessive moisture was removed from the filter paper by continuing suction for several minutes after filtration was complete. The filter paper with precipitate was placed in a bacteriological incubator and allowed to dry overnight; next morning the weight of the precipitate was estimated to the nearest 0·1 g.

The results were expressed in terms of benzoic acid excretion:—

$$\text{Benzoic acid excretion} = 0{\cdot}68\,\frac{(W + 0{\cdot}33 \times V)}{100}\ \text{g.}$$

where W = weight of hippuric acid precipitate, and V = volume of urine used in the actual analysis.

Note.—Molecular weight of benzoic acid = 0·68 × molecular weight of hippuric acid, and 100 c.cm. of urine will dissolve 0·33 g. of hippuric acid at room temperature.

The usual range of normal excretion is 2·5 to 3·3 g. of hippuric acid (in terms of benzoic acid), variations being due to the differences in size of normal subjects.

RESULTS AND THEIR INTERPRETATION

Tests were performed on the following groups: (1) 50 normal adult men chosen as controls to establish a "base-line" for the investigations; (2) 157 cases of untreated early syphilis, investigated as they arrived at hospital; (3) 188 cases of early syphilis already under arsenical treatment. In this last group the total amounts of arsenical already taken varied from 0·3 g. to 23·5 g. of neoarsphenamine, and from 0·04 g. to 0·66 g. of 'Mapharside.'

In all, 708 tests were carried out, including frequent tests upon jaundiced patients. Only once was the test dose of sodium benzoate vomited.

TABLE I—COMPARISON OF HIPPURIC ACID EXCRETION IN THREE GROUPS

Hippuric acid excretion (g. benzoic acid)	Controls (50)		Early syphilis before treatment (157)		Early syphilis under arsenical treatment (188)	
	Cases	%	Cases	%	Cases	%
0 –0·49	0	0	0	0	0	0
0·50–0·99	0	0	0	0	3	1·6
1·00–1·49	0	0	0	0	8	4·2
1·50–1·99	1	2	5	3·2	11	5·8
2·00–2·49	2	4	10	6·5	29	15·4
2·50–2·99	6	12	19	12	31	16·6
3·00–3·49	15	30	45	28·7	50	26·6
3·50–3·99	13	26	41	26·1	30	16
4·00–4·49	8	16	24	15·3	17	9
4·50–4·99	3	6	9	5·7	9	4·8
5·0 +	2	4	4	2·5	0	0

The results are shown in table I. It will be noted that 6% of normals and 9·7% of the untreated early syphilitics gave readings of less than 2·5 g. benzoic acid. The significance of this finding cannot be assessed without further investigation. However, of the patients with early syphilis under treatment with arsenicals, 27% returned excretion figures less than 2·5 g. benzoic acid, although they were free from abnormal signs and symptoms. Evidently arsenotherapy impairs the normal detoxicating function as estimated by hippuric acid tests. On the other hand, we could find no direct relation

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TABLE II—(A) NORMAL HIPPURIC ACID EXCRETION DURING ARSENOTHERAPY

(B) DIMINISHING HIPPURIC ACID EXCRETION DURING ARSENOTHERAPY; NO JAUNDICE AFTER CESSATION OF TREATMENT

Case	Age	Date	Arsenical	Total given (g.)	Hippuric acid excretion (g.)
1	21	Feb. 20, '43	M	0·0	3·1
		Mar. 27, '43		0·44	2·6
		Apr. 10, '43		0·50	2·6
		May 5, '43		..	3·5
2	28	Feb. 21, '43	M	0·0	2·9
		Mar. 7, '43		0·20	3·8
		Mar. 23, '43		0·34	3·3
		Apr. 1, '43		0·42	3·6
3	34	Mar. 12, '43	M	0·0	4·7
		Mar. 19, '43		0·14	3·4
		Apr. 2, '43		0·32	4·1
		Apr. 18, '43		0·50	3·5
4	29	Nov. 12, '42	N	0·0	4·1
		Nov. 22, '42		0·3	4·1
		Mar. 5, '43		4·35	3·9
		Mar. 19, '43		..	3·3
		Apr. 2, '43		4·95	3·5
5	30	Dec. 1, '42	M	0·0	4·1
		Feb. 11, '43		0·86	3·4
		Mar. 24, '43		..	3·0
		Apr. 30, '43		1·3	3·3
6	34	Jan. 31, '43	M	0·0	3·2
		Mar. 2, '43		0·26	3·8
		Mar. 22, '43		0·48	3·5
		Apr. 5, '43		0·60	3·8
		May 3, '43		0·84	3·5
7	37	Oct. 20, '42	N	1·2	3·4
		Oct. 24, '42		1·65	3·3
		Feb. 12, '43		5·1	3·2
		Apr. 9, '43*		8·1	1·8
		Apr. 23, '43		..	1·1
8	34	Nov. 2, '42	N	0·0	3·5
		Nov. 12, '42		0·75	3·4
		Mar. 5, '43		5·85	2·2
		Mar. 26, '43		..	1·0
		Apr. 2, '43		..	1·4
9	22	Nov. 28, '42	M	0·0	4·2
		Feb. 8, '43		0·86	1·9
		Mar. 19, '43		..	1·7
		Apr. 1, '43		..	3·9
		May 3, '43		1·2	2·5
10	30	Jan. 8, '43	M	0·0	4·6
		Feb. 21, '43		0·56	1·7
		Mar. 23, '43		0·86	1·6
		Apr. 30, '43		..	0·75
11	29	Nov. 16, '42	N	0·75	4·0
		Jan. 15, '43		4·85	4·8
		Mar. 5, '43		7·25	2·5
		Mar. 19, '43		..	3·1
		Apr. 9, '43*		..	1·7
12	35	Apr. 22, '43	N	4·05	2·7
		May 10, '43		..	1·8
		May 17, '43		..	2·1
		May 24, '43		..	1·4
		May 31, '43		..	1·2
		June 21, '43		..	3·2

* Excess urobilin present in urine.
M = mapharside.
N = neoarsphenamine.
Jn = Jaundice.

(C) DIMINISHING HIPPURIC ACID EXCRETION DURING ARSENOTHERAPY. JAUNDICE AFTER CESSATION OF TREATMENT

Case	Age	Date	Arsenical	Total given (g.)	Hippuric acid excretion (g.)
13	21	Feb. 10, '43	M	0·0	3·2
		Mar. 16, '43		0·44	0·8
		Apr. 5, '43		0·62	0·7
		Apr. 20, '43		..	1·9
		Apr. 22, '43		Jn	..
		May 1, '43		..	2·6
		May 10, '43		..	2·4
		May 17, '43		..	2·7
		May 24, '43		..	3·4
14	26	Jan. 19, '43	M	0·0	3·9
		Mar. 9, '43		0·58	2·0
		Mar. 18, '43		0·7	2·3
		Apr. 2, '43		0·82	2·0
		Apr. 22, '43		1·27	0·4
		Apr. 26, '43		Jn	..
		May 1, '43		..	1·1
		May 10, '43		..	2·3
		May 17, '43		..	3·0
15	24	Oct. 13, '42	N	0·0	3·3
		Dec. 24, '42		0·75	3·7
		Jan. 3, '43		5·15	3·8
		Mar. 18, '43		5·45	2·2
		Mar. 31, '43		7·8	2·3
		Apr. 23, '43		..	0·4
		Apr. 24, '43		Jn	..
		May 1, '43		..	2·5
		May 10, '43		..	3·2
16	35	Dec. 24, '42	M	0·06	3·7
		Mar. 12, '43		0·36	3·3
		Apr. 16, '43		0·86	2·8
		May 3, '43		1·06	1·0
		May 5, '43		Jn	..
		May 10, '43		..	1·7
		May 17, '43		..	2·6
		May 24, '43		..	2·0
		May 31, '43		..	1·9
17	33	Dec. 30, '42	M	0·0	3·3
		Feb. 24, '43		0·68	3·1
		Mar. 30, '43		0·86	4·2
		Apr. 9, '43		..	1·9
		Apr. 22, '43		Jn	..
		Apr. 26, '43		..	2·0
		May 4, '43		..	3·6
		May 10, '43		..	2·7
		May 17, '43		..	3·0
18	34	Jan. 11, '43	M	0·0	3·9
		Jan. 24, '43		0·14	3·7
		Mar. 11, '43		0·8	2·6
		Apr. 7, '43		..	2·0
		Apr. 22, '43		Jn	..
		Apr. 30, '43		..	0·47
		May 4, '43		..	0·6
		May 10, '43		..	0·1
19	29	Feb. 12, '43	M	0·0	3·7
		Feb. 24, '43		0·04	3·1
		Mar. 13, '43		0·36	3·8
		Apr. 7, '43		0·50	2·9
		Apr. 30, '43		0·68	2·7
		May 29, '43		Jn	..
		June 8, '43		..	2·0
		June 14, '43		..	1·6
		June 21, '43		..	2·0
20	33	Dec. 29, '42	M	0·04	3·8
		Feb. 25, '43		0·68	3·5
		May 16, '43		..	2·4
		May 20, '43		Jn	..
		May 24, '43		..	2·4
		May 31, '43		..	1·4
		June 8, '43		..	1·3
		June 24, '43		..	1·1
		June 27, '43		..	1·4
21	38	Jan. 9, '43	M	0·0	4·8
		Feb. 16, '43		0·36	3·5
		Mar. 23, '43		0·64	3·4
		Apr. 17, '43		..	0·8
		Apr. 22, '43		Jn	..
		Apr. 30, '43		..	1·5
		May 4, '43		..	1·6
		May 10, '43		..	2·2
		May 17, '43		..	2·6
22	44	Dec. 15, '42	M	0·0	3·6
		Apr. 2, '43		0·86	3·0
		May 10, '43		1·36	2·6
		May 23, '43		Jn	..
		May 30, '43		..	2·0
		June 8, '43		..	2·6
		June 14, '43		..	2·4

between the results of the Quick test and the amounts of arsenical taken. Thus the effect of arsenicals on the liver seems to depend primarily on individual sensitiveness rather than on the quantity given.

In patients taking arsenicals, tests were repeated as often as possible, though it was not practicable to test them all before every injection. In most instances a satisfactory excretion level was maintained (table II A); but whenever hippuric acid excretion fell substantially, as confirmed by a second test two days later, treatment with arsenicals was stopped. In such cases routine Quick tests were continued until liver function returned to normal. Table II B shows that further toxic effects were thus avoided in patients free from untoward signs and symptoms at time of testing, and it may be assumed that in some cases clinical jaundice was actually prevented by timely cessation of treatment. Jaundice ensued in approximately 30% of the cases in which treatment with arsenicals was stopped; examples are given in table II C. This, however, was to be expected, since the arsenical is probably only one of the ætiological factors in post-arsenical jaundice. The warning of liver damage sometimes preceded the onset of jaundice by as much as 5 weeks; so unnecessary additional noxious effects were avoided in these cases also. The value of the routine tests is not to be judged entirely by their possible prevention of jaundice, for they also prevent toxic effects that are not clinically appreciable.

Finally, regular Quick tests were performed in cases of postarsenical jaundice (table II C). In this group the test did not reveal any particular range of values with which clinical jaundice coincided; but, as would be expected, results of 1·0 g. and below were associated with jaundice far more often than not. In a separate series of 65 cases of arsenical jaundice, 5 showed normal hippuric acid excretion at the onset, but there was a later fall to subnormal in 3 (the other 2 were not followed up). Tests were performed fortnightly on jaundiced patients and the return to normal detoxifying function was demonstrated. The findings verified the statement that in jaundice low initial Quick-test readings imply neither a bad prognosis nor the probability of permanent effect on the detoxicating power of the liver (Quick 1936).

SUMMARY AND CONCLUSIONS

The hippuric acid test revealed impairment of liver function in a significant proportion of patients receiving arsenical treatment for syphilis. This impairment bore no relation to the total quantity of drug given, and was attributable to individual sensitiveness to arsenicals.

The failure of detoxifying function detected by this test preceded the onset of jaundice and the appearance of bile products in the urine. The warning thus given by the test made it possible to stop arsenical injections and so avoid additional toxic effects. Nevertheless jaundice ensued in about 30% of the cases in which arsenical treatment had stopped.

Institution of routine hippuric acid tests during treatment with arsenicals is recommended wherever practicable.

Fortnightly tests in cases of postarsenical jaundice showed a steady and sometimes rapid return to normal function. A very low hippuric acid test result does not necessarily imply a fatal outcome or irreparable damage to the hepatic detoxifying mechanism.

The laboratory work was performed in the Wilkie surgical research department of Edinburgh University through the hospitality of Prof. J. R. Learmonth. We have to thank Major-General J. A. Manifold, CB, DDMS Scottish Command, for permission to publish this paper; and Lieut.-Colonel G. L. Montgomery, RAMC, ADP Scottish Command, and Lieut-Colonel P. A. Stewart, RAMC, officer commanding the military hospital, for facilitating the investigation. Our thanks are also due to laboratory and hospital staffs for their technical assistance.

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SULPHAMEZATHINE IN LOBAR PNEUMONIA

A COMPARISON WITH SULPHAPYRIDINE

G. MELTON, MD LOND, MRCP
SENIOR PHYSICIAN, DUDLEY ROAD HOSPITAL, BIRMINGHAM

SULPHAMEZATHINE, originally termed sulphamethazine, a dimethyl derivative of sulphadiazine, was introduced by Macartney et al. (1942), as a sulphonamide remedy, particularly for lobar pneumonia. It is said to have high therapeutic efficiency, with little tendency to cause nausea, vomiting or cyanosis. Furthermore, its ready solubility reduces the likelihood of renal damage—an advantage claimed over sulphadiazine. It is rapidly absorbed but slowly excreted, and as vomiting is uncommon a satisfactory concentration can be maintained in the blood by administration of large doses six-hourly.

Macartney treated 71 cases of pneumococcal pneumonia with a mortality of 7%. The results were similar to those he obtained with sulphapyridine in 1940. Jennings and Patterson (1942) reported preliminary trials of sulphamezathine in children, including 18 cases of bronchopneumonia and 6 of lobar pneumonia, all of which recovered. Peters and Easby (1943) treated 77 cases of pneumonia in children and adults with a mortality of just over 4%, which compared favourably with their results with sulphapyridine in 1939 and 1940; 51 of their patients had bronchopneumonia, 30 following measles.

COMPARISON OF RESULTS WITH SULPHAMEZATHINE AND SULPHAPYRIDINE

Ages	SULPHAMEZATHINE			SULPHAPYRIDINE		
	Cases	Recoveries*	Deaths*	Cases	Recoveries*	Deaths*
Up to 1	14	11 (78·5%)	3 (21·5%)	5	4 (80%)	1 (20%)
1 to 2	11	11 (100%)	0	8	7 (87·5%)	1 (12·5%)
2 to 5	17	17 (100%)	0	15	13 (86·6%)	2 (13·4%)
5 to 40	47	47 (100%)	0	86	85 (98·8%)	1 (1·2%)
40 to 50	23	21 (91·3%)	2 (8·7%)	26	21 (80·8%)	5 (19·2%)
50 to 60	12	11 (91·7%)	1 (8·3%)	18	15 (83·4%)	3 (16·6%)
Over 60	10	7 (70%)	3 (30%)	21	14 (66·7%)	7 (33·3%)
All ages	134	125 (93·3%)	9 (6·7%)	179	159 (88·9%)	20 (11·1%)

* % of total cases in each age-group.

During 1943 in the Dudley Road Hospital, 134 cases of lobar pneumonia were treated by myself with sulphamezathine, and 179 cases by other members of the staff with sulphapyridine. (An additional group of 33 received sulphadiazine.) The patients in each group were admitted to the same wards, but on different days of the week. Diagnosis was established clinically and in the sulphamezathine series was usually confirmed radiologically and (in the adults) by examining the sputum for pneumococci. Oxygen therapy was given when indicated.

The table summarises the results. It will be seen that the case-mortality was 6·7% with sulphamezathine and 11% with sulphapyridine. The mortality with sulphamezathine was highest during the first year of life and after the age of 60, whereas in the sulphapyridine series 75% of the deaths were after the age of 40. The mortality in the sulphapyridine group was definitely higher than is generally obtained with the drug in lobar pneumonia, for figures of 6 to 8% have been recorded in previous years. This may be partly because 35% of these deaths occurred within 24 hours of admission and some of the patients were moribund when treatment began. Vomiting of the sulphapyridine by some of them may also have prevented adequate absorption of the drug. Only 1 patient of the sulphamezathine group died on the first day of treatment, but 2 who were apparently moribund on admission improved considerably and survived 3 and 7 days. An infant with staphylococcal pneumonia and empyema treated with sulphamezathine, and 2 children with staphylococcal pneumonia (1 with meningitis) treated with sulphapyridine, all of whom died, are not included. (There were 3 deaths in the 33 cases treated with sulphadiazine.)

Peters and Easby found a slower response with sulphamezathine than with sulphapyridine, but in the present series sulphamezathine usually seemed to act as rapidly as sulphapyridine. Thus with sulphamezathine 45% of the cases became apyrexial after one day's therapy, and 33% after two days, while with sulphapyridine the figures were 43% and 33%.

With regard to relapses necessitating a second course of the drug, and not due to complications such as empyema, there were 2 cases (1·5%) in the sulphamezathine group and 5 (3%) in the sulphapyridine group, but 2 of the latter had very short courses of the drug.

COMPLICATIONS

Complications may be summarised as follows:—

SULPHAMEZATHINE

Empyema: 4 cases (3%). All pneumococcal and all recovered. In 2 (perhaps 3) the complications developed before treatment with the drug started.
Lung abscess: 1 case. Recovered.
Otitis media: 3 cases. Present on admission. Recovered.
Phlebitis: 1 case. Recovered.

SULPHAPYRIDINE

Empyema: 8 cases (4%). All pneumococcal. In 3 (perhaps 4) the empyema was present on admission. 2 deaths.
Lung abscess: 1 case. Recovered.
Bacterial endocarditis: 1 case. Died.
Pericarditis: 1 case. Died.
Otitis media: 1 case. Recovered.
Pulmonary embolism: 1 case. Died.

Certain associated conditions preceding the pneumonia should be noted:—

SULPHAMEZATHINE

Pregnancy (with empyema) 1 case. Aborted but recovered.
Pellagra and severe macrocytic anæmia: 1 case. Recovered
Bronchiectasis: 1 case. Died.
Numerous cases with *chronic bronchitis* and *emphysema.*

SULPHAPYRIDINE

Pregnancy: 3 cases (1 with empyema). All delivered during illness and all recovered.
Mitral disease: 4 cases. 1 death.
Congenital heart disease: 1 case. Recovered.
Bronchiectasis: 3 cases. 2 deaths.
Numerous cases of *bronchitis* and *emphysema.*

TOXICITY AND DOSAGE OF SULPHAMEZATHINE

Toxicity.—In the sulphamezathine series nausea was occasional, but only 4 patients vomited (3 slightly and 1 with hiccup). Vomiting never prevented effective administration of the drug. At least 12 patients had had sulphapyridine before admission, and 7 of these had vomited after taking it.

Oliguria developed in a very toxic patient aged 62, but it is not certain that it was due to the drug. One old lady with bronchitis, not included in this series, developed hæmaturia but recovered. The urine of many patients was microscoped, but no sulphamezathine crystals were detected. (Incidentally, 2 of the sulphadiazine patients developed hæmaturia.) There were 2 cases of drug fever and 1 of drug rash. No cyanosis definitely attributable to the drug was found. A fall in the white-cell count of the blood was frequently noted in the 90 cases in which counts were made, but in only 5 did the figure fall below 5000, the lowest recorded being 3600 in the patient with pellagra, who had leucopenia

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before treatment began. Some of the 65 cases in which the hæmoglobin was estimated showed a drop during treatment, but how much of this was due to the toxæmia could not of course be ascertained. The fall was never serious.

Concentration in the blood.—Preliminary results of an investigation by Miss H. Trought, biochemist to the hospital, show wide variation between different patients. In any one patient, however, the concentration of the drug in the blood was maintained for several hours after a dose. These observations are similar to those of Macartney et al. (1942).

The *dosage* was similar to that used by Macartney for adults, and by Jennings and Patterson (1942) for children. Thus adults received an initial dose of 4 g. followed by 2 g. six-hourly. Children were given :—

Age (years)	*Initial dose (g.)*	*Six-hourly dose (g.)*
0– ½	1·0	0·5
½– 2	1·5	0·75
2– 5	2·0	1·0
5–10	2·5	1·5
10–15	3·0	2·0

Administration was maintained for several days after the patient became apyrexial.

The drug was given intravenously for a time to 5 very ill patients (1 infant and 4 adults) and was well tolerated, although 3 of the adults died of the disease.

CONCLUSION

These observations confirm that sulphamezathine is highly satisfactory in lobar pneumonia. The mortality-rate with sulphamezathine was considerably lower than with sulphapyridine, and even allowing for the possibility that the sulphapyridine group contained a higher proportion of more serious cases, sulphamezathine proved at least as effective as sulphapyridine. Its lower toxicity may help to reduce the mortality in very ill patients, while the virtual absence of vomiting ensures more complete absorption.

There is no evidence that complications or relapses are more common with sulphamezathine than with sulphapyridine, and they may possibly be less. The drug usually appears to act equally quickly, although, of course, the unlikelihood of vomiting makes possible the employment of larger doses of sulphamezathine. The rarity of urinary complications and of cyanosis due to the drug is confirmed. No evidence of any serious action of sulphamezathine on the bone-marrow was found, although the occasional presence of leucopenia shows the need for blood-counts during any long course of treatment. More information is required about its action in staphylococcal pneumonia, but the failure recorded here and by Peters and Easby suggests that sulphathiazole should remain the drug of choice in this condition.

SUMMARY

A series of 134 cases of lobar pneumonia treated with sulphamezathine is compared with a series of 179 cases treated with sulphapyridine. The cases in the two series were admitted on different days of the week, but were not specially selected in any other way.

The mortality-rate was 6·7% in the sulphamezathine series and 11·1% in the sulphapyridine series.

On the whole, sulphamezathine appeared to act as rapidly as sulphapyridine, and its toxic effects were slight, although there was occasional leucopenia.

Sulphamezathine is at least as effective as sulphapyridine. When given by mouth it rarely causes vomiting, and its injection is very seldom required.

My thanks are due to Dr. T. M. Anderson, medical superintendent, for permission to publish this paper; to Dr. W. Whitelaw, pathologist, and to Miss Trought, biochemist, in whose departments the pathological investigations were carried out; and to the other physicians for their kindness in letting me use their records. The sulphamezathine was supplied by IC (Pharmaceuticals) Ltd.

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Reviews of Books

Principles of Allergy

(2nd ed.) WARREN T. VAUGHAN, MD MICH. (Kimpton. Pp. 176. 10*s*.)

How to live with your allergy—man's white elephant—is described in this primer for the lay reader. Dr. Vaughan, who directs the allergy clinic at Richmond, Va., describes how the various allergens invade the body, the reactions which result, the methods of defence to be used to combat the invaders and methods of attack. In days when allergy is becoming popular as a teatime topic in fashionable circles, it should have a place on the bookshelf of every sufferer. It is also a light and amusing but constructive book for the physician in his leisure.

Public Health and Preventive Medicine

MORTON C. KAHN, MA, D SC, associate professor of public health, Cornell University, New York. (Oxford University Press. In two volumes. Pp. 267 and 266. 25*s*.)

THE Oxford Medical Outline Series are not textbooks but statements of beliefs current at the time of publication; since they avoid controversial matter as far as possible, they age quickly, and when obsolete should be scrapped. For teaching students they are invaluable; they are not written for specialists and the volumes under review are insufficient for those taking degrees or diplomas in public health, though they are a good epitome and refresher. With an appropriate interrogation at the head of each paragraph, they provide a catechism of public health doctrine. Unfortunately they cover only United States practices and law, which differ much from ours. The book is divided into environmental sanitation, transmissible diseases, and public health administration. The first and third sections are mere outlines, but diseases are dealt with in some detail. There is no mention of the common food-poisonings, though botulism is treated as a transmissible disease. Rubella, infective hepatitis and glandular fever are omitted, and in the parasitic section, though strongyloides and hymenolepis are described, bilharzia and dracontia are unmentioned. Scabies is ignored, and pediculi are mentioned only as vectors of typhus and relapsing fever. The style is terse and dogmatic, as it should be in a work of this kind. Blank pages are provided for the book to be kept up to date, and the index is good.

Specialties in Medical Practice

Renewal Pages. (Nelson).

THESE 1943 loose leaves revise the original pages published in 1940. A new chapter on minor surgery is so capacious that beginning with closed wounds it ends with hives, having taken in coronary thrombosis and hysteria en route. Don King has carried out a radical revision of the section on orthopædics, but this section still tends to be too much of a catalogue, and not sufficiently discriminating. Protrusion of an intervertebral disc as a cause of sciatica, for instance, is dismissed in a few lines without any guide to its incidence or importance; and in the treatment of gonococcal arthritis of the knee no mention is made of the sulphonamides. The section on vitamins has also been thoroughly revised, and here Dwight L. Wilbur shows commendable caution in his assessment of the clinical value of the newer vitamins and of the extent to which vitamin deficiency plays a part in the ætiology of disease, apart from the well-recognised syndromes. Migraine is discussed in the section on allergy, and the difference in emphasis between English and American teaching is evident in the stress laid upon allergic factors in its ætiology. The other sections revised are those on ophthalmology, neurology, psychiatry, obstetrics and gynæcology, urology, dermatology and syphilis, and diseases of the ear, nose and throat. There is also a carefully revised index. The new edition maintains the standards we have come to expect from editor and authors.

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THE LANCET

LONDON: SATURDAY, FEBRUARY 26, 1944

A NATIONAL HEALTH SERVICE

MANY of us could plan an ideal medical service, and many of us have tried to do so. Some of our plans are perhaps more attractive than the one now produced by the Government, which approaches the millennium somewhat indirectly. The task of legislators, however, is to adapt existing means to future ends, and the proposals of the white-paper aim at achieving a major reform with a minimum of disturbance and a maximum of good will. Concessions were made, and compromises reached, before these proposals were issued for discussion; but the scheme as it stands is bold as well as reasonable. Much remains to be decided and defined; but within the framework suggested it would be possible soon to increase the value of medical knowledge to the public, to give most doctors more satisfaction in their work, and in so doing to prepare the way for a really fine service in years to come.

The Government stand by their policy declared in Ministers' speeches, but have made it more acceptable. They rightly say that the time has come when everyone should have equal opportunity to benefit from the best medical care available. This means that such care must be publicly provided for everyone alike, free of charge; though no-one need be debarred from making other arrangements privately if he wishes. It also means that the duty of provision must be specifically placed on somebody; and here the Government, for reasons stated, reject the idea of a semi-autonomous national medical corporation and the idea of local health boards not answerable to the electorate. At present, they point out, much of the duty rests on local government authorities; and they hold to their belief that the "intimate and personal services" of health should generally be the direct responsibility of the people living in the locality, with only enough central direction to secure coherence and consistency throughout the country. Almost everybody agrees that none but the biggest of the existing authorities could provide a complete medical service; so the white-paper proposes that, pending reform of local government, the task should be given to new "joint authorities" (joint boards) formed of representatives of the counties and county boroughs of the area. The first job of each joint authority will be to make an "area plan" showing precisely how the local population can get every kind of medical care they need. After approval by the Minister of Health this plan will come into operation. The members of the joint authority, as elected agents of the public, will be solely responsible for the plan and its fulfilment; but in making or changing it they must consult a statutory advisory body of medical and other experts called the local health services council. This local professional council may proffer its advice not only to the joint authority and its constituent local authorities but also to the Minister himself; and the latter, in framing regulations, must consult his own advisory professional body, the Central Health Services Council. So far, it will be noted, the administrative functions of medical men and women are purely advisory: no places on the executive councils are reserved for them. But the Government also propose to form, in England and in Scotland, executive Central Medical Boards, composed mostly of doctors, which under the general direction of the Minister would be the "employer" of all general practitioners entering the National Health Service. The family doctor would thus be saved from becoming the salaried servant of a local authority, and in so far as control is inevitable it would be exercised mainly by colleagues.

General practitioners form the large majority of the profession. Does the scheme give them a square deal? In the first place neither they nor any other doctors are obliged to take part in it. If they want to join the Service they may practise individually ("separately") from their own homes or surgeries, receiving a capitation fee for each patient; or they may practise, on the same terms, in groups or partnerships; or they may take their practices—for which they will be compensated—into one of the health centres to be established by (in England and Wales) the county or county-borough council, in which case they will have a tripartite contract with the council and with the Central Medical Board which pays their salary. Except perhaps for newcomers to practice in their early years, they may retain the right to take fees from patients who prefer to consult them privately; though nobody must be given "reason to believe that he can obtain more skilled treatment by obtaining it privately than by seeking it within the new service"—which may be difficult. To secure better distribution of doctors the Central Medical Board may deny a new assistant to a practitioner in an "over-doctored" area, or may close down a practice in such an area when it becomes vacant; but no-one settled in a practice will be asked to leave it. When a vacant practice is deemed redundant, and therefore cannot be sold in the ordinary way, compensation will be paid to the owner or his heirs. The terms of compensation, like the scale of salaries and capitation fees, are to be discussed with the profession. Assuming them to be satisfactory, it seems to us that the scheme, with its multiformity and room for experiment, goes a long way to remove the fears so often expressed by practitioners. The Government affirm, as plainly as one could wish, that their National Health Service "must not destroy the sense of choice and personal association which is at the heart of 'family' doctoring"; and "whatever the organisation, the doctors taking part must remain free to direct their clinical knowledge and personal skill for the benefit of their patients in the way which they feel to be best." On the positive side the Service will increasingly provide the facilities every practitioner should command—irrespective of whether the patient can pay for them or of "any other factor irrelevant to the real need." For those joining a health centre it offers trial of a new and promising technique of practice, and for all it should mean closer association with hospitals and consultants, and a better chance to get results.

Hospital and consultant services are to be arranged by the joint authority. Each joint authority will take over the municipal hospitals of its area and will invite voluntary hospitals to participate in its area

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plan by accepting patients free of charge, and by providing consultants, in return for payments at standard rates for the services rendered. The payments thus made will be supplemented by a direct grant to the hospital by the Exchequer, but no attempt will be made to reimburse the whole cost of the voluntary hospitals' part in the public service. The Government want to preserve the independence and individuality of these institutions, and this cannot be done unless they "still look substantially to their own financial resources, to personal benefactions and the continuing support of those who believe in the voluntary hospital movement." The conditions on which they will qualify for Exchequer grants do not in any way interfere with their liberty to excel: they will be asked to accept national scales of salaries for nurses and domestics; appointments to their senior staff may be limited to candidates selected by a regional advisory body (composed perhaps of consultants and teachers); and, like the municipal hospitals, each would be inspected from time to time by medical and other experts appointed for the purpose by the Minister; but no attention is paid to the purist view that boards of management receiving public money should include official nominees to keep an eye on its expenditure. Each hospital will itself enter into the necessary engagements with the consultants and specialists it needs to do any work it undertakes under the area plan. To avoid anomalies some central regulation of salary scales will be required, but consultants may be employed either full-time or part-time and at one or several hospitals, and will be free to practise privately if they choose. A fuller scheme will be worked out after the Goodenough Committee on medical schools has reported, and obviously it will have to meet two outstanding needs—more consultants and better distribution of them.

"There are not yet enough men and women of real consultant status and one of the aims will be to encourage more doctors of the right type to enter this branch of medicine or surgery and to provide the means for their training. . . . The consultant service still needs to be organised with the teaching centre as its focus, but the service must be spread over a wider area by enabling and encouraging consultants taking part in it to live and work further afield. Apart from the main effect of greater accessibility to the public, this will also have a beneficial effect upon general medical practice over larger areas—where the habitual presence and services of consultants will serve as a means of continuous postgraduate education."

A good recipe does not necessarily mean a good pudding; and no doubt some cooks would make a mess of the ingredients and directions of the white-paper. But readers will be impressed by its considerate tone, and we have good hope of agreement on the vital details, now left open, if the Government follows its principle that "organisation is needed to ensure that the service is there, that it is there for all, and that it is a good service; but organisation must be seen as the means, and never for one moment as the end." That the man in the street will welcome the plan, when he understands it, is certain; and at first of course he may expect too much. Full medical care for everyone demands personnel and resources the nation does not yet possess, and (as pessimists keep reminding us) the number of doctors remains the same whatever they are called. Equally, however, the number of pieces in a jigsaw remains the same after they have been fitted together—but they make a more comprehensible picture. The new National Service must set itself from the first to make more economical use of the doctors available; and for our part we do not see how this can be done in general practice without rapid development of health centres, which could do much to conserve the doctor's time and energy. Such centres are admittedly an experiment, but surely not a very dangerous one; and we hope that the "selected areas" in which they are tried, in various forms, will be numerous. Presumably large Government expenditure on permanent buildings for the social services will be postponed until a slump threatens to succeed the postwar boom; but as soon as fighting ceases we shall be left with many new buildings—ranging from great hospitals down to reception stations and movable huts—some of which might be quickly adapted to the requirements of an expanding medical service. Likewise much surplus equipment should be obtainable from the Forces.

Good houses, good food, good work, and security are basic conditions of health. But we should not therefore underestimate the contribution that can be made by a first-class medical, nursing and hospital service making full use of our knowledge, both old and new. It is our duty to evolve such a service, and in so doing we shall be happier for knowing that its benefits are for all who need them, regardless of money. Our profession is at last leaving the market-place.

QUICK CURE FOR SYPHILIS?

FOR some years after EHRLICH introduced "606" in 1910 it was believed that syphilis could be cured by a few injections of the drug given over a short period. This view was still held in the last war, but it slowly came to be realised that a negative Wassermann reaction and healing of visible lesions did not always mean cure; thereafter, though intensive treatment still had its vogues, a long course of weekly injections of some arsenical compound, together with mercury and later a bismuth preparation, became the standard treatment of early syphilis. In the present war intensive treatment has returned to favour in the United States of America, and on a small scale in this country. Its obvious advantages—rapid control of infection, saving of the patient's time, and elimination of the interruptions in treatment that may arise from the patient's default or other circumstances—are particularly attractive in time of war. But these must be weighed against its inconvenience to the patient and the added risk of toxic reactions.

Many of the earlier schedules of intensive therapy were largely empirical and inadequately controlled, and serious complications, some fatal, were encountered. The adoption of an arsphenoxide compound ('Mapharside') in place of neoarsphenamine, increasing skill in the early recognition of serious intolerance, and the use of quantitative serological estimations in the assessment of progress and cure have placed intensive arsenotherapy on a more satisfactory basis. EAGLE and HOGAN[1] point out that the total curative dose for early syphilis—about 1500 mg. of mapharside for a man of average weight—is relatively constant and largely independent of the frequency of injection

1. Eagle, H. and Hogan, R. B. *Vener. Dis. Inform.* 1943, 24, 159.

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or the duration of treatment. The margin of safety of any intensive schedule is thus a function of its toxicity. This margin of safety, calculated from animal data on toxicity, has varied from 3 to 10 arbitrary units in the treatment schedules which have been used in man. The recorded incidence of toxic reactions and of deaths has been in accord with, and predictable from, this calculated margin. Thus, the standard weekly treatment, with a safety margin of 10, has a fatality-rate of less than 1 in 3000 cases; the five-day administration of 1200 mg. by intravenous drip, with a safety margin of 3, has resulted in a fatality-rate of 1 in 200 and serious intolerance in 1 of every 100 patients treated. EAGLE and HOGAN maintain that a margin of safety of 6 to 8 (less than 1 death per 1000 cases treated) is not achieved by any schedule in which the total curative dosage is given in 20 days or less. It may be achieved, however, by giving treatment in tri-weekly injections for 7 weeks, daily injections for 6 weeks, or multiple daily injections for 4–6 weeks. A tri-weekly schedule can be used in ambulant cases and is being tried by 80 coöperating clinics in the United States. Other points being studied include the value of concurrent bismuth injections, the determination of the minimum effective total dosage, and the possible extension of this treatment to cases of latent syphilis. The long-term results must wait 10–20 years for final assessment. The most serious complications of intensive therapy are granulopenia and hæmorrhagic encephalitis. In addition, serious intolerance and secondary fever may occur, most often about the ninth day of therapy, with or without the erythema of Milian. The risk of agranulocytosis demands frequent differential white-cell counts, while chemical and microscopic examination of the urine should be carried out daily. Jaundice has been an infrequent complication and is usually associated with the ninth-day syndrome. Encephalitis is more common in women than men and is the commonest cause of death. For this reason the mortality from intensive therapy should be less in Service cases than in civilians. The successful management of intensive therapy demands thorough initial physical and laboratory examination of the patient, and close supervision throughout the course by a syphilologist who has made a special study of these methods.

Intensive therapy will naturally appeal to Service authorities whose responsibility for returning their VD casualties to full duty quickly is urgent; modifications of a twenty-day schedule are already employed by some of the Allied Service hospitals in Britain. Since November, 1942, intensive syphilis therapy has been a prominent feature of the VD control programme of the Chicago Health Department.[2] The programme's primary object has been to control effectively, and with all possible speed and safety, the spread of venereal diseases. Sources of infection are found by a thorough search for and complete examination of all known contacts of infected military personnel, the routine examination of such groups as selective-service registrants and court cases, and the coöperation of tavern, hotel and industrial groups in searching out suspects. All cases of early syphilis (under 2 years' duration), all proved or suspected cases of gonorrhœa, and all patients with acute undiagnosed genital lesions are admitted to hospital for investigation and treatment. Policy and treatment are decided on by an authoritative advisory committee, and a team of experts carry out the physical and laboratory examinations. Three schedules of intensive syphilis therapy have been used:

1. *Fever chemotherapy.*—Patients receive one injection of bismuth twenty-four hours before being submitted to eight hours of artificial fever at 106° F., and during their period in the hypertherm cabinet a total of 1·76 mg. of mapharside per kg. body-weight is given in 3 equal doses.
2. *Intensive chemotherapy.*—Patients receive 80 mg. of mapharside twice daily for seven days and 2 c.cm. of bismuth subsalicylate in oil every second day for 4 doses.
3. *Long-term intensive chemotherapy.*—Patients receive 1 mg. of mapharside per kg. body-weight thrice weekly for eight weeks combined with 1 c.cm. of bismuth subsalicylate twice weekly for 16 doses.

Fever chemotherapy has been used in 488 patients with 1·6% failures (2 serological and 6 clinical relapses); intensive chemotherapy in 208 patients (observation period too short for analysis), and long-term intensive chemotherapy in 81 patients with one (serological) relapse. The preliminary report from Chicago deals with patients treated between November, 1942, and October, 1943. The effect of this campaign on the incidence of early syphilis in the Chicago area will be seen in due course. It has lately been reported that penicillin, of proved value in gonorrhœa, has also given good initial results in a few cases of early syphilis.[3] Beginning within 10 days of the appearance of the primary sore, four patients were given 25,000 units four-hourly into the gluteal muscles for eight days (total 1,200,000 units). All responded well, serological tests becoming negative.

These developments in antisyphilitic treatment open up a bright vista for the control of syphilis in the near future. But high hopes have often been raised in the past by new treatments for gonorrhœa and syphilis, and have as often been dashed; will these prove the happy exception? For the present the War Office[4] does not recommend intensive arsenotherapy as part of the routine treatment of syphilis in British soldiers. In their view it should be used only where standard methods are impracticable, and then with all possible safeguards.

Dr. JOHN EYRE, consulting bacteriologist to Guy's Hospital and emeritus professor of bacteriology in the University of London, died at Ivy Hatch, near Sevenoaks, on Feb. 17 at the age of 74. Dr. JOHN FAWCETT, consulting physician to the hospital, died in London on the following day. He was in his 78th year.

2. Bundesen, H. N., Bauer, T. J. and Kendell, H. W. *J. Amer. med. Ass.* 1943, 123, 816.

3. Mahoney, J. F., Arnold, R. C. and Harris, A. *Amer. J. publ. Hlth*, 1943, 33, 1387.

4. *Army med. Dep. Bull.* November, 1942, p. 8.

COURSES FOR DEMOBILISED DOCTORS.—Mention was made in these columns on Feb. 12 (p. 217) of the conference lately held at the Ministry of Health, where representatives of the medical faculties of the universities considered what types of postgraduate education should be organised for demobilised medical officers. It is hoped to resume discussion of the subject at a second conference to be arranged shortly. Consideration is also being given to the financial arrangements necessary to enable medical officers to take advantage of the opportunities for postgraduate education.

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Annotations

STORY OF A LECTURESHIP

IN 1920, Dr. Bernard Myers, with the example of his native New Zealand before him, established and organised as a teaching centre a clinic for children in a slum area near Marylebone Road. The clinic prospered but eventually proved its own undoing, because on its advice the Marylebone Borough Council replaced the slums by ideal buildings and most of the patients disappeared. The clinic was therefore wound up; after all expenses had been paid and donations made to the Royal Waterloo and Royal National Orthopædic Hospitals a sum of £700 remained which Dr. Myers handed to the Royal College of Physicians to found a lectureship in children's diseases and to provide a medal for the lecturer. The first lecture, appropriately delivered by Prof. L. G. Parsons, appears on our opening page and was prefaced by a tribute to Dr. Charles West, whose name is commemorated in the title. West was at one time senior censor RCP as well as Harveian orator, Croonian and Lumleian lecturer. He was pioneer of modern pædiatrics in this country, and founder of the most famous of all children's hospitals. Even before the hospital in Great Ormond Street came to birth in 1849 he had published a volume of *Lectures on the Diseases of Infancy and Childhood* which ran through seven editions and was translated into almost every European language. He was described by a contemporary as a charming writer, a fine public speaker, an earnest fighter and a searcher after truth. His life work is summed up in words with which he introduced the last edition of his book: "While thirty years ago there was not a single hospital for sick children in the whole of the British Dominions or in America, the Hospital for Sick Children in Great Ormond Street and its thirty daughters will now tell, if my name should be at all remembered, that it was permitted me to live not altogether to myself, but in some degree at least to serve my generation and to help those little ones whom I so much love."

DIGITALIS AND THE RACKETEERS

DIGITALIS has probably seldom been put to criminal purposes, though Glaister [1] says it has been used at least once as a homicidal poison. Hedley [2] tells of a vast American racket in which the harmless, old-fashioned foxglove played a prominent part. American life-insurance companies in the '30s insured against total and permanent disability, the amount of insurance obtainable depending on the size of the life policy which the policy-holder had taken out. About 1931, at the height of the economic depression, two firms of New York lawyers began to persuade policy-holders to submit fraudulent health claims. Runners persuaded middle-aged men, usually in a small way of business, to consult these lawyers, who consented to take their cases on a percentage basis. The policy-holders were taught to simulate heart disease, particularly angina pectoris. They were rehearsed in the history they were to tell and the symptoms they were to simulate. They were then sent to their family doctors, who not unnaturally were often innocently taken in by the plausible story of angina pectoris, commonly elaborated to include a history suggestive of a previous coronary thrombosis. This last episode had always occurred when the patient was on holiday or at some place where the family doctor could not be called in. Often the malingerer was admitted to hospital for the heart attacks which he had been taught to simulate in public. Sometimes it could be arranged that he was admitted under a doctor in the plot, who ensured that a careful note of the cardiac symptoms was made. (One of the false claimants almost met his end by being operated on for appendicitis by one of the doctors in the ring.) The final step was to try and obtain a certificate from a reputable cardiologist. At this stage digitalis was given with a view to producing electrocardiographic changes which might be mistaken for those of coronary sclerosis. It was usually given in ordinary dosage and in most cases produced flattening of the ST segment; others showed varying degrees of auriculoventricular block, and a few developed extrasystoles. Claimants were to run to the consultation, climb stairs, drink large amounts of coffee and even have an alcoholic debauch. If the cardiologist's certificate was not satisfactory it was destroyed and another opinion was sought; if it was satisfactory a claim was submitted to the insurance company. Every effort was made by the lawyers to obtain a cash settlement, so that they obtained their percentage commission. Some of the successful claimants turned runners for the lawyers. Life-insurance policies amounting to more than $10,000,000 in more than 40 different companies were involved, and cash settlements reached several hundred thousand dollars. Two physicians were convicted after trial, pleaded guilty and were sentenced, 3 were indicted but pleaded not guilty, and 10 confessed but were not indicted. The racket might never have been discovered had not greed begotten greed. At first false claims were restricted to claimants in the fifties, but when a steadily increasing number of policy-holders under the age of 40 sent in claims based on coronary occlusion, suspicions were roused.

1. Glaister, J. Medical Jurisprudence and Toxicology, 1938, Edinburgh, p. 667.
2. Hedley, O. F. *Ann. intern. Med.* 1943, 18, 154.

PATIENTS AS STAFF

AN evening newspaper reports [1] that at the Central Oklahoma State Hospital for the mentally ill (2600 beds) Dr. D. W. Griffin, the superintendent, engages suitable patients to fill the posts left vacant by peace-time domestic workers. He has been able, it is said, to appoint 54 men and women to full-time duties, and only 3 have had to be relieved of them. Most improve considerably in confidence, especially those who are drawing wages for the first time in their lives. Moreover they are more sympathetic with the other patients than domestics brought in from outside.

In British hospitals patients often take a share in the ward domestic work, usually to the benefit of their mental state. It might well be worth appointing some of them to the paid staff, and keeping them on after discharge, if they were willing. In hospitals for mental defectives it is common for patients to do much of the cleaning required, receiving in return their board, lodging, and care, and pocket-money amounting to 6*d*. a week. Some of these work hard and well, and might be considered for remuneration nearer that of the average resident ward-maid. It would give them self-respect, improve their status with their relatives, and play some part in removing the stigma still attaching to mental disease and disability.

A COMBINED SCHOOL OF NURSING

THE voluntary hospitals of Sheffield have united to found a single school of nursing which will open on June 1. The scheme has been planned by a committee under the chairmanship of Prof. G. A. Clark, dean of the faculty of medicine in Sheffield University. The four hospitals participating are the Sheffield Royal Infirmary, the Royal Hospital, the Jessop Hospital for Women, and the Children's Hospital, which have 1200 beds between them. Nurses entering training will attend a preliminary training school for 3 months. At first this school will be split up among the four hospitals; later it is hoped to provide a separate building to take 50 resident students, and when that time comes the municipal hospital will probably also share in it. The Sheffield School of Nursing will prepare students for state registration in

1. *Star*, Feb. 7.

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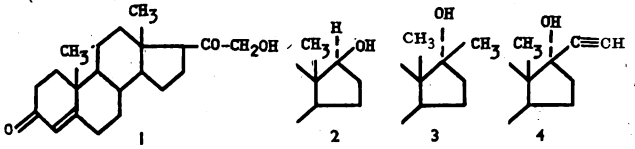
general or sick children's nursing. The school will be controlled by a nursing school committee composed of members from the units of the four voluntary hospitals, with power to elect an independent chairman. This body will be responsible for the general policy and management of the school and for its financial side. A supervising tutor, with the status of matron, will be appointed to take charge of the school, and be responsible for the whole training curriculum, subject to the general control of the nursing school committee. Under her will be the five sister-tutors of the four participating hospitals. The four matrons of the hospitals, with the supervising tutor, will form a matrons' committee to select students, supervise the domestic arrangements of the preliminary training school, and advise the nursing committee.

Student nurses admitted to the school must be 18 if starting general training and over 17¾ years if they intend to train as sick children's nurses. They will circulate through the four hospitals, those taking general training spending not less than 2 years at the Royal Infirmary and the Royal Hospital, and not less than four months in each of the other two hospitals. There will be about 360 students in training at a time and about 150 will enter yearly. The founding of this school is a first small-scale experiment in regional planning of nursing education. In wishing it well we may hope that its experience will be happy enough to encourage others.

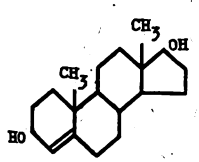
ADRENAL INSUFFICIENCY

In Addison's disease administration of desoxycorticosterone acetate, together with salt, usually causes improvement and occasionally removes almost all symptoms. Since the adrenal secretion contains at least five recognised hormones, besides several less well identified, it is remarkable that the result of therapy with only one of them should be so good.

Talbot, Butler and MacLachlan [1] have now examined the additional effect of related hormones on the metabolism of a girl, aged 8, suffering from Addison's disease, moniliasis and hypoparathyroidism, who had already been treated with desoxycorticosterone acetate and salt. The compounds used were testosterone, methyl testosterone, anhydrohydroxy progesterone (ethisterone), and methyl androstenediol, the first three of which differ from desoxycorticosterone merely in the groupings around the 17 carbon atom; while the fourth has the further difference that the ketonic group of the 3 carbon atom is replaced by a hydroxyl group. The structural formulæ show the close chemical relationships between the compounds:



1. Desoxycorticosterone. 2. Testosterone. 3. Methyl testosterone. 4. Ethisterone.



5 Methyl androstenediol.

In the patient studied, testosterone and methyl testosterone produced striking improvement in physical strength and well-being with a positive nitrogen balance and a gain in weight. Testosterone propionate was capable of maintaining health and weight without the addition of desoxycorticosterone, but when desoxycorticosterone acetate was omitted during the period of methyl testosterone therapy, the weight fell and the patient showed signs of impending crisis, though the nitrogen balance remained positive. The results were thus good, but the possible masculinising properties of these hormones over a long period was feared, and the other two substances were tried instead. The androstenediol gave rise to undesirable gastro-intestinal symptoms, but the effects of the ethisterone, though milder than those of testosterone derivatives, were definite and promising. It is relevant to mention that Palmer and deRonde [2] have shown that the masculinising effect of testosterone passes off fairly rapidly on cessation of therapy.

None of these substances had the OH group on the 11 carbon atom, which is present in corticosterone, and they also differed from it in having no effect on carbohydrate metabolism. The most striking effect on electrolyte metabolism was that of testosterone on the serum potassium, which fell to values less than 3 mg. per 100 c.cm., without any symptoms. We recently noted the association of a low serum potassium, due to the administration of desoxycorticosterone acetate, with attacks of muscular weakness in dogs.[3] A single human patient [4] who developed similar symptoms offers the only example, apart from familial periodic paralysis, in which low blood potassium had been suggested as a cause of paralytic symptoms. Selye and Hall,[5] who also studied toxic effects of desoxycorticosterone acetate on dogs, found, however, that the paralytic effects of poisonous doses are really due to sodium poisoning, the low serum potassium being merely incidental. Butler, Talbot and MacLachlan [6] have demonstrated that this low serum potassium after testosterone administration is not confined to patients with Addison's disease. Over 10 months the child whom they investigated developed from a thin to a plump girl, with an increase in weight of 7 kg.; changes in secondary sexual characteristics were negligible, but development of the skeleton was striking; the bones at the end of the period corresponded to those of a child of 11, a change normally occupying three years having been achieved in less than one.

Many diseases, regarded at one stage as due to lack of a single substance, are now turning out to be due to complex deficiencies. Fair therapeutic results are often obtained by replacing the principal want, but only a careful study of all missing factors can bring full recovery within reach.

VEGETABLES AND HOW TO COOK THEM

Nutrition experts have shaken our confidence in our cooking of vegetables, without always giving us a clear call to follow. Miss Phyllis Garbutt, principal of the Good Housekeeping Institute, who addressed the Royal Society of Arts on Feb. 16, was able to allay some doubts. Vegetables consist of 80% or more of water, and their chief nutritive value is in mineral salts and vitamins. Our forbears cooked them with butter and cream and very little water—a good way because nothing was lost and much was added. We are not just now in a position to follow their example, but we can curb our own errors. The common vitamins in vegetables are A or its precursor carotene, B_1 and C. Vitamins B_1 and C and mineral salts are soluble in water; vitamin C is destroyed by much heat, and also by oxidation if cut surfaces are exposed to air. She quoted the finding of Fenton that the vitamin-C content of cooked vegetables can be taken as a measure of good cooking; for if it is well conserved the virtues of good colour, good texture, and pleasant aroma and taste will be keeping it company. This can be achieved by using only a little water and cooking for only as long as serves to soften the cellulose. She believes in picking and eating vegetables while they are still young and succulent, and "all young vegetables

1. Talbot, N. B., Butler, A. M. and MacLachlan, E. A. *J. clin. Invest.* 1943, **22**, 583.
2. Palmer, H. D. and deRonde, M. *J. clin. Endocrinol.* 1943, **3**, 428.
3. *Lancet*, 1943, ii, 579.
4. Thorn, G. W. and Firor, W. *J. Amer. med. Ass.* 1940, **114**, 2517.
5. Selye, H. and Hall, C. E. *Arch. Path.* 1943, **36**, 19.
6. Butler, A. M., Talbot, N. B. and MacLachlan, E. A. *Proc. Soc. exp. Biol., N.Y.* 1942, **51**, 378.

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should be plainly cooked and dressed." If two or three lots of vegetables are cooked in the same water, a saturated solution of mineral salts and vitamin C is reached which will extract little of value from the last boiling, besides forming material for a good soup. Stalks and outer leaves can be boiled first in the water for a few minutes, with the same end in view. For large-scale cookery, Miss Garbutt favoured the plan of putting relays of vegetables, slung in string bags, into the boiler, so that diners coming in at irregular intervals would all get their vegetables reasonably freshly cooked. Sodium bicarbonate put in to maintain the colour does not destroy the vitamins unless the vegetables are allowed to stand for a long time after cooking, when both vitamins C and B_1 suffer, and the vegetables themselves become mushy. In her view it is unnecessary unless for old stringy vegetables which could not otherwise be eaten. The outside leaves of cabbage, which are rich in vitamin C, can be softened in boiling water, wrapped round a mince stuffing, and served with brown sauce. Potatoes baked in their jackets can be stuffed with grated cheese, or mince, and vegetable soups can be made from the parts of vegetables which cannot be used otherwise. She suggests serving at least two vegetables at meals, besides potatoes, and she recommends a separate course of vegetables as an occasional substitute for soup.

CENTENARY OF A DIRECTORY

THE centenarian who retains his memory unimpaired is a wise person; if he also retains his sense of proportion he is a happy one. The Medical Directory has done both and by surviving its competitors has well illustrated what an elderly peripatetic pointed out last week, that youth has a poor chance against age at its best. As a desk companion even the Medical Register is out of the running except as an index to save the exasperating search for a name in two or more sections, and the only serious drawback of the Directory would be gone if as the first virile act of its second century it forgoes the distinction between London and Provinces, long worn thin and now obliterated by sectors and postwar planning—and even lacking the doubtful merit of being invidious. We can use the plain speaking of the family circle because the Churchill who launched the Medical Directory, in the year in which the business which he founded came of age, was bringing out THE LANCET, then only two years past its own majority; and Thomas Wakley's "exterminating onslaught ... against ... disquieting and knavish advertising quacks" is paralleled by John Churchill's "puling literary bantling ... ushered into the world" by three "savans" who stole his mantle to cover it. Churchill's avowed object was to promote union amongst all grades of the profession and the first volume was presented as a "mere epitome" of what it was to become. The 10,962 entries in the 1850 directory have grown to 70,917 entries in the centennial volume[1] (of which 2682 are the names of temporarily registered practitioners). "As a matter of paper and print it is not dear"—we can still agree with these words in the first postscript.

SERUM DIASTASE IN MUMPS

THE estimation of blood or serum diastase (=amylase) is a valuable aid in the diagnosis of the milder forms of acute pancreatitis. The symptoms of upper abdominal pain, vomiting, jaundice, &c., may be caused by many kinds of lesions but if the blood diastase is raised it is safe to attribute them to non-hæmorrhagic pancreatitis. Diastase is a normal component of the external secretion of the pancreas, and accordingly there is nothing unexpected in its passage into the blood-stream either because the pancreatic duct is obstructed or because the cells producing the enzyme are damaged. Since diastase—or amylase—is also a constituent of saliva, lesions of the salivary glands might also increase the blood diastase. Brinck and Gülzow[1] reported a raised value in every one of 9 cases of mumps, and Murphy, Bozalis and Bieri[2] found raised values in all but 3 of 35 mumps patients. The values were not as a rule so high as those found in acute pancreatitis. The normal value[3] ranges from 80 to 150 units per ml. and in pancreatitis the concentration is commonly over 1000 units per ml.[4] In mumps the values are usually between 200 and 1000 units per ml., though one case of 4000 units per ml. is reported.[2] However, it is not certain that the raised blood diastase is a direct effect of parotitis, since some degree of pancreatitis may be a secondary effect of mumps. Egdahl[5] reported that of 105 cases of pancreatitis 10% were complications of mumps, while among 7054 cases of mumps reviewed by Brahdy and Scheffer[6] acute pancreatitis was diagnosed in 171. Thus the raised blood-diastase values in mumps may be due to a secondary pancreatitis not severe enough to give rise to abdominal symptoms. In general, diastase values are not affected by sex, age, diet or starvation[7] and are lowered by infections or liver disease.[8] The test should be useful, therefore, in the differential diagnosis of mumps and other cervical adenopathies.

HOME-MADE PENICILLIN: A WARNING

IN the United States the impression is spreading that the production of penicillin preparations suitable for external application is a simple matter that can be undertaken in laboratories possessing limited facilities, or even in the kitchen. Raper and Coghill,[9] who are working on the production of penicillin for the US Department of Agriculture, think the time has come for a warning. It is, they say, misleading if not actually dangerous to say that *Penicillium notatum* is the green or blue-green mould found on bread, cheese or other foods; it does grow on these things, but so do many other blue-green moulds. There are, in fact, scores of blue-green species in the genus penicillium which can be distinguished from *P. notatum* only by painstaking cultivation and microscopical examination in the laboratory. Of a large number of moulds obtained from foodstuffs, fruit, soil and other sources not one in a hundred have been *P. notatum*, and even these often yielded no appreciable quantity of penicillin. Many of the moulds so far studied have been shown to produce substances which are as harmful to animals as they are to bacteria—one has lately been advocated as a rat-poison—and the same is likely to apply to the legion which have not yet been investigated. Moreover, cultures of genuine *P. notatum* are liable to become contaminated with other species or with pathogenic organisms, and this is particularly likely to happen when the mould is grown under "home-made" conditions. Patients, too, may become sensitive to the mould proteins which are always present in crude preparations, especially when a large raw area, such as a burn, is being treated. The purified preparations of penicillin are protein-free, and each batch is tested for activity, toxicity and sterility. To sum up, Raper and Coghill feel that home-made penicillin can be dangerous. But they recognise the importance of the attempts to evolve a simpler penicillin therapy, and the Minister of Health has also expressed his interest in this work.

1. The Medical Directory: 100th annual issue. (J. and A. Churchill. Pp. 2426. £3 3s.)

1. Brinck, J. and Gülzow, M. *Z. klin. Med.* 1936, **131**, 747.
2. Murphy, J. P., Bozalis, G. S. and Bieri, E. J. *Amer. J. Dis. Child.* 1943, **66**, 264.
3. Somogyi, M. *Arch. intern. Med.* 1941, 67, 665.
4. Heifitz, C. J., Probstein, J. G. and Gray, S. H. *Ibid*, 1941, **67**, 819.
5. *Bull. Johns Hopk. Hosp.* 1907, **18**, 130.
6. *Amer. J. Sci.* 1931, **181**, 255.
7. Lewison, E. F. *Surg. Gynec. Obstet.* 1941, 72, 202.
8. Gray, S. H., Probstein, J. G. and Heifitz, C. J. *Arch. intern. Med.* 1941, **67**, 805.
9. Raper, K. B. and Coghill, R. D. *J. Amer. med. Ass.* 1943, **123**, 1135.

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Reconstruction

A NATIONAL HEALTH SERVICE

THE GOVERNMENT'S WHITE PAPER

THE white-paper [1] issued last week begins by repeating the Government's pledge that they intend to establish a National Health Service which will provide for everyone, without charge, all the medical advice, treatment and care they may need. This is regarded as the necessary next stage in a steady historic process. It is in accord with the Beveridge report, but may be considered separately. The proposals are now put forward, not as fixed decisions, but for discussion in Parliament and in the country. The Government have promised that those directly concerned—the local authorities, the medical profession, the voluntary hospitals, and others—shall be fully consulted before final decisions are taken. The Government will welcome constructive criticism; and they hope to be able to submit quickly to Parliament legislative proposals which will be largely agreed.

Summary of Proposals

SCOPE OF THE NEW SERVICE

A National Health Service will be established. This Service will be available to every citizen in England, Scotland and Wales.

There will be nothing in the new service to prevent those who prefer to make their own private arrangements for medical attention from doing so. But for all who wish to use the service it will provide, without charge, a complete range of personal health care—general and specialist, at home, in the hospital and elsewhere, including drugs and medicines and a wide range of appliances.

STRUCTURE OF THE SERVICE

Central.—(i) Central responsibility to Parliament and the people will lie with the Minister of Health and the Secretary of State for Scotland. (ii) At the side of the Minister there will be a professional and expert advisory body to be called the Central Health Services Council. This will be a statutory body and its function will be to provide professional guidance on technical aspects of the health service. There will be a similar body in Scotland.

Local.—(i) Local responsibility will be based on the county and county-borough councils, which are the major local government authorities now. They will administer the new service partly in their present separate capacities over their present areas; partly—as the needs of the service require—by combined action in joint boards over larger areas. (ii) Areas suitable in size and resources for hospital organisation will be designated by the Minister after consultation with local interests. (iii) The county and county-borough councils in each area will combine to form a joint authority to administer the hospital, consultant and allied services; in the few cases, for example London, where the area coincides with an existing county area the authority will be the county council of that area. (iv) At the side of each new joint authority there will be a consultative body—professional and expert—to be called the Local Health Services Council. (v) Each joint authority will prepare—in consultation with the Local Health Services Council—and submit for the Minister's approval an area plan for securing a comprehensive health service of all kinds in its area. (vi) County and county-borough councils will be separately responsible for the local clinic and other services in accordance with the area plan. Responsibility for child welfare will be specially assigned in whatever way child education is assigned under the current Education Bill.

HOSPITAL AND CONSULTANT SERVICES

It will be the duty of the joint authorities themselves to secure a complete hospital and consultant service for their area—including sanatoria, isolation, mental health services, and ambulance and ancillary services in accordance with the approved area plan. The joint authorities will do this both by direct provision and by contractual arrangements with voluntary hospitals (or with other joint authorities) as the approved area plan may indicate.

The powers of present local authorities over these services and the ownership of their hospitals will pass to the joint authority. Voluntary hospitals will participate, if willing to do so, as autonomous and contracting agencies; if so, they will observe the approved area plan, and certain national conditions applying to all hospitals in the new service alike; they will perform the services for which they contract under the plan, and receive various service payments from both central and local funds. Special provision will be made for inspection of the hospital service through centrally selected expert personnel.

Consultant services will be made available to all, at the hospitals, local centres, or clinics, or in the home, as required; they will be based on the hospital service, and arranged by the joint authority, either directly or by contract with voluntary hospitals under the approved area plan. Measures for improving the distribution of consultants, dealing with methods of appointment and remuneration, and relating the consultant service to other branches of the new service generally, will be considered after the report of the Goodenough Committee.

GENERAL MEDICAL PRACTICE

Everyone will be free, under the new health service, to choose a doctor—the freedom of choice being limited, as now, only by the number of doctors available and the amount of work which each doctor can properly undertake.

Medical practice in the new service will be a combination of grouped and separate practice. Grouped practice means practice by a group of doctors working in coöperation. Separate practice means practice by a doctor working on his own account—broadly similar to practice under the present National Health Insurance scheme, but with important changes.

Grouped practice will be conducted normally, though not exclusively, in specially equipped and publicly provided health centres. In England and Wales, the centres will be provided and maintained by county and county-borough councils—in Scotland, by the Secretary of State with power to delegate to a local authority.

General practice in the National Health Service will be in the main organised centrally under the responsible Health Ministers. All the main terms and conditions of the doctor's participation will be centrally settled, and much of the day-to-day administration will be the function of Central Medical Boards—one for England and Wales and one for Scotland—largely professional in composition, and acting under the general direction of the Health Ministers.

The main duties of each Board will be:

(i) to act as the "employer" of the doctors engaged in the public service. Thus, the Board will be the body with which every doctor will enter into contract. In the case of practice in health centres in England and Wales, however, there will be a three-party contract between the Board, the local authority and the doctor.

(ii) To ensure a proper distribution of doctors throughout the country. For this purpose the Board will have power to prevent the taking over of an existing public practice or the setting up of a new public practice in an area which is already "over-doctored."

It is not proposed that there should be a universal salaried system for doctors in the new service. Doctors engaged in health centres will be remunerated by salary or the equivalent; doctors in separate practice normally by capitation fee. In some cases—e.g., grouped practice not based on a health centre—remuneration by salary or the equivalent could be arranged if the doctors concerned so desired. Rates of remuneration will be discussed with the medical profession.

It is not proposed to prohibit doctors in public practice from engaging also in private practice for any patients who still want this. Where a doctor undertakes private in addition to public practice, the number of patients he

1. A National Health Service. Ministry of Health and Department of Health for Scotland. HM Stationery Office. 1944. Pp. 85. 1s. Abridged version. Pp. 32. 3d.

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is permitted to take under the national service—and consequently his remuneration—will be adjusted.

Young doctors entering practice in the public service for the first time will normally be required to serve for a period as assistants to more experienced practitioners; and the Central Medical Board will have the power to require them to work full time in the public service, in their early years, if necessary.

Compensation will be paid to any doctor who loses the value of his practice—e.g., by entering a health centre or because he is prohibited from transferring the practice to another doctor on the ground that there are too many doctors in the area.

Superannuation schemes will be provided for doctors in health centres and the possibility of providing them in other forms of practice will be discussed with the profession, and the practicability of abolishing the sale and purchase of public practices will be similarly discussed.

Arrangements for the supply of drugs and medical appliances will be considered and discussed with the appropriate bodies.

CLINICS AND OTHER SERVICES

It will be the duty of the joint authority to include in its area plan provision for all necessary clinics and other local services—e.g., child welfare, home nursing, health visiting, midwifery and others—and to provide for the coördination of these services with the other services in the plan.

County and county-borough councils will normally provide most of these local services. The exact allocation of responsibility between the joint authority and the individual county and county-borough councils will be finally settled in each case in the approved area plan; but the principle will be that services belonging to the hospital and consultant sphere will fall to the joint authority while other local and clinic services will fall to the individual councils. Child welfare duties will always fall to the authority responsible for child education under the new Education Bill.

New forms of service—e.g., for general dentistry and care of the eyes—will be considered with the professional and other interests concerned. In the case of dentistry the report of the Teviot Committee is awaited.

ORGANISATION IN SCOTLAND

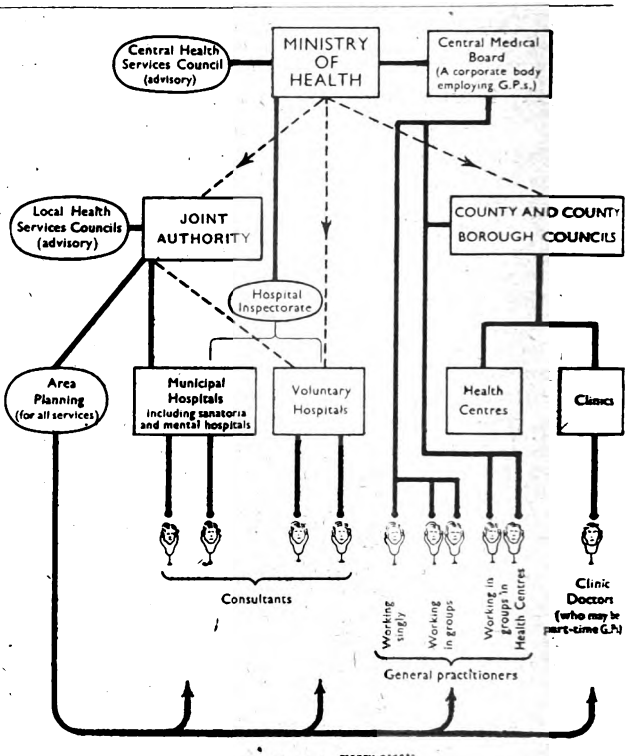
The scope and objects of the service will be the same in Scotland as in England and Wales, but subject to certain differences due to special circumstances and the geography and existing local government structure in Scotland. For example, 80% of Scotland's population lives in about 17% of the total area of the country; and only 10 out of 55 health authorities have populations of more than 100,000.

The local organisation in Scotland will differ from that in England and Wales and will be on the following lines:

(i) Regional Hospitals Advisory Councils will be set up for each of five big regions, based on Glasgow, Edinburgh, Aberdeen, Dundee, and Inverness. These councils will be advisory to the Secretary of State on the coördination of the hospital and consultant services in each region. Members of each council will be nominated in equal numbers by voluntary hospitals and joint hospital boards. There will be an independent chairman.

(ii) Since these regions are thought to be too large to provide administrative units, Joint Hospitals Boards will be formed by combination of neighbouring major local authorities (county councils and town councils of large burghs) within the regions to ensure an adequate hospital service in their areas. The Boards will take over all responsibility for the hospital services of the constituent authorities (including services like the tuberculosis dispensaries, which essentially belong to the hospital and consultant field) and will also arrange with voluntary hospitals.

(iii) The joint boards will prepare a scheme for the hospital service in their areas and submit this to the Secretary of State, who will consult the Regional Hospitals Advisory Council before approving or amending it. The powers of the Secretary of State will be strengthened to enable him to require major local authorities to combine for any purpose proved necessary after local inquiry.



A NATIONAL HEALTH SERVICE
The Government scheme visualised

(iv) Education authorities (county councils and town councils of four cities) will retain responsibility for the school health service and clinics, until the medical treatment part of the school service can be absorbed in the wider health service. Existing major health authorities (county councils and town councils of large burghs) will normally retain responsibility for the ordinary local clinic and similar services; the necessary coördination will be secured through their membership of the joint hospitals boards and through the Local Medical Services Committee.

(v) Local Medical Services Committees—advisory bodies consisting of professional and local authority representatives—will be set up over the same areas as the Joint Hospitals Boards. The committees will advise the Secretary of State on local administration of the general practitioner service and will provide liaison between the different branches of the service.

FINANCE

It is estimated that the cost of the new National Health Service will be about £148,000,000 a year compared with about £55,000,000 spent from public funds on the present health services. The cost will be met from both central and local public funds.

Proposals in More Detail

The service may be described as free, universal, and complete, but not compulsory; it is to include a complete medical service, dental and ophthalmic treatment, drugs and surgical appliances, and home nursing. There must be ready access for everyone to every part of the service he or she needs. The scheme is not planned as something entirely new, but as a closing of the great gaps in our present services. It will take time to complete the plan, particularly the full dental and ophthalmic services, but a sound plan must be laid now.

GENERAL PRACTICE

The arrangements for general practice are considered both the most important and the most difficult part of the proposals. The family doctor will be the first line of defence; and it is generally through him that the patient

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will gain access to other forms of medical care. Every patient will have freedom of choice among the doctors available. Doctors must not be regimented in such a way as to prevent them using their skill in the way they think best for their patients. But the state must somehow make sure that there are enough doctors everywhere to provide an adequate service.

The Government place grouped practice in the forefront of their plans. But we have not yet had enough experience to translate the idea generally into practice. Experiment is necessary, both to find out how best doctors can work together, and how the public take to the idea. Further, it could not be introduced everywhere simultaneously. The change, even if experience shows it should be complete, will need time. So grouped and separate practice will both be inside the service, though grouped practice will first start in urban areas.

Grouped practice will be encouraged both with and without special premises or health centres. It will offer new facilities for teamwork, refresher courses, and holidays. Full scope will be given to development of health centres, and there must be room for experiment in design. Broadly speaking, each health centre will provide individual consulting-rooms, reception and waiting-rooms, simple laboratory facilities, nursing and secretarial staff, telephones and other accessories. According to circumstances there will be dark-rooms, recovery and rest rooms, and facilities for minor surgery. It will be important to avoid the atmosphere of the impersonal clinic where the doctor's individuality is lost in an anonymous service.

Centres will be provided and maintained by county and county-borough councils. They will be distributed according to the area plan, which will be drawn up in consultation with the medical profession and approved by the Minister. The wish of local doctors to enter centres must be a big factor in deciding to provide them in any locality; but in the last resort, the decision must rest on public need. The initiative for providing health centres will thus ultimately lie with the area authority.

In Scotland, because, it is said, the scale of the problem is smaller, the centres will be provided and maintained by the Secretary of State for Scotland. He will be able to hand them over to local authorities if this seems desirable.

Doctors continuing in separate practice will provide their own consulting-rooms and equipment, and the general framework of the scheme will be similar to National Health Insurance. But they will have behind them the complete specialist, clinic, and hospital service. Doctors at present in practice will be able to remain where they are and take part in the new national service. But new entrants must, to some extent, be regulated, if the distribution of doctors is to be satisfactory.

Central Medical Boards.—In each country a mainly professional board will be responsible for much of the general practitioner service. It will be appointed by the Minister, and will be responsible to him. It will be the employer of the doctor taking part in the new service; but in England and Wales, since the local authorities will provide the health centres and equipment, there will be a three-party contract between the Central Medical Board, the local authority and the doctor. Terms of service will be negotiated and settled centrally; but a doctor will only be able to be dismissed by the joint action of the Board and the local authority, or (if they disagree) by the Minister.

The Board will watch over the general distribution of public medical practice. In separate practice, the Board must consent before a vacant public practice is refilled or a new one established. But consent will be withheld only if there are already enough doctors in an area. In health centre practice it will appoint new doctors when vacancies occur.

The Board will act as a general bureau for advice and help in the movements of doctors within the public service, and in the various personal problems which will arise.

The Minister will consult with the profession about all appointments to the Board. It will be a small body, under a regular chairman, with a few of its members full time.

Local NHI committees will be abolished and their minor day-to-day work handed over to local committees of the Board, on which members of local authorities will be included.

Remuneration and terms of service.—These are left for discussion with the profession. The Government's general proposals are as follows: A universal salaried service is not necessary for the efficient working of the scheme. But in a health centre it is fundamental that the team of doctors should not be competing for patients; so remuneration by capitation fee would be inappropriate. The Government therefore propose salaries or some other basis than capitation fees; and they are ready to discuss details and scales with the profession.

Doctors in separate practice will be remunerated on a capitation system, with the maximum number of patients per doctor suitably regulated. But it would be possible, if desired by the doctors themselves, for doctors in private groups or even working singly to be remunerated by salary, or in some other way.

Whatever methods of payment are adopted, the most important thing to decide will be what is, on ordinary professional standards, the reasonable and proper pay for a whole-time general practitioner.

The contract with the doctor entering public service will need to provide, among other things:

1. For him to give all normal professional advice and services, within his competence, to those whose care he undertakes.
2. For him to comply with approved local arrangements for the supply of consultant, specialist and hospital services.
3. For machinery for hearing complaints by patients, and for general disciplinary and appeal procedure on NHI lines.
4. For observing reasonable conditions, centrally determined with the profession, about certification and other matters.

It is not proposed to prohibit doctors entering the service from treating privately patients who do not want to take advantage of the new arrangements. To safeguard the interests of such doctors' public service patients, the size of their permitted lists will be reduced appropriately.

Doctors entering health centres from private practice will presumably bring most of their patients with them. So they will be allowed private practice in the same way as in separate practice. The new doctor entering a health centre, after his apprenticeship, may be required, if it is necessary in the public interest, to devote his whole time for a few years to public practice on a salaried basis. The volume of private practice will, in any event, greatly diminish under the new scheme. The essential point is that no-one must be made to believe he can obtain more skilled or considerate treatment by paying privately for it than he can within the terms of the public service.

The Government propose that all young doctors shall go through a short period of apprenticeship as assistants to more experienced practitioners, when they enter the public service for the first time. The Central Medical Board will be able to grant exceptions, if, for example, an assistant's post is not reasonably obtainable. The conditions governing the employment of assistants by doctors outside health centres, but inside the public service, will also be regulated by the Board.

There is a case for the abolition of the sale and purchase of publicly remunerated practices. But it is not

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essential to the scheme, and it would involve great practical difficulty. The Government, however, intend to discuss the whole matter further with the profession.

Where the Central Medical Board refuses to consent to the sale of a practice in an over-doctored area, compensation will be paid to the outgoing doctor or his representatives. Where a doctor in separate practice decides to enter a health centre, he will be exchanging a practice with a realisable value for one which he will be barred from selling on retirement. He will be gaining superannuation rights and other valuable facilities, and the Government intend to strike a fair balance between what he gains and loses and compensate him accordingly. A superannuation scheme for doctors in separate practice presents difficulties, but the Government propose to try to work one out on a contributory basis.

New doctors entering health centres from hospital will not buy their way in, but will be appointed by the Medical Board and the local authority. Whether the appointments will be made by the local committees of the Central Medical Board (which have members of local authorities on them), or by the Board centrally, is not stated.

To sum up, from the doctor's point, the varieties of general practice which will be open to him are:

1. Completely private practice, either separate or combined, with such patients as chose not to avail themselves of the national service.
2. Separate or combined practice, outside a health centre, with most patients on a capitation-fee basis, but with those who choose not to avail themselves of the national service paying privately.
3. The same, but on a salary and a pension basis.
4. Combined group practice, inside a health centre, with salary and a pension: (*a*) in the case of doctors already in practice, private practice being permitted from the start; (*b*) in the case of new doctors, private practice being permitted after a period of whole-time salaried work, if such whole-time work is necessary in the national interest.

HOSPITALS

The new hospital service must be complete and of easy access to all. It must include general and special hospitals, mental hospitals, fever hospitals, sanatoria, accommodation for maternity cases, the chronic sick, and rehabilitation, and ancillary services—pathology, X-ray, electrotherapy, ambulances, &c. It must be based on areas really suitable for hospital organisation. And it must enable the country's two main hospital systems to work closely together. The Government's proposals are based on the fullest coöperation between the voluntary and municipal hospitals.

The populations of counties and county boroughs vary enormously. At one end of the scale are Rutland and Canterbury with 18,000 and 26,000. At the other (leaving aside London) are Middlesex and Birmingham with 2,000,000 and 1,000,000. With a few exceptions, counties and county boroughs are not large enough to serve an area on which a unified hospital service could be based. Such an area must fulfil three conditions:

(*a*) Its population and financial resources must be sufficient to make possible an adequate, efficient, and economical service.
(*b*) It should normally include both town and country areas, if both are to get the best.
(*c*) It should be big enough for most of the varied hospital and specialist services to be organised within it—leaving only certain highly specialised for inter-area arrangement.

Exact estimates of the ideal size and population of a hospital planning area cannot be made. Ideals must depend on local circumstances. So the Government propose new joint authorities, to be formed of representatives of existing county and county-borough councils. The areas to be covered by these joint authorities will be settled by the Minister after consultation with local interests at the outset of the scheme. In some exceptional cases, for example the County of London, combination will be unnecessary. The new authorities will take over the ownership and management of all publicly owned hospitals, including mental hospitals and isolation hospitals.

The first task for each new joint authority will be to prepare *an area health service plan*. This will involve assessing hospital needs, available hospital resources, and what additions or adaptations are wanted to make the resources fit the needs. It will involve also the assessing of needs and supplies of general practitioners, health centres and clinics. In all this there will be full consultation with local professional and other interests, including the voluntary hospitals. The plan will then be submitted for approval to the Minister, and will have no validity until so approved.

No mention is made of planning and administrative staffs for the joint authorities; on the calibre of these staffs the final success of the whole national service is likely to depend.

Although the approved plan will define the parts to be played by both the voluntary and joint-authority hospitals, voluntary hospitals will not be compelled to take part. But the Government trust that they will not hesitate to do so. Without them it would take many years to build up a system that would really meet the needs of the whole population. It is not the wish nor the intention of the Government to make participation in the scheme a lever for gradually altering the status of the voluntary hospitals. Participation will rest on a contract between the joint authority and the voluntary hospital, the hospital undertaking to provide the services specified in the area plan and to abide by conditions applying to all hospitals and settle centrally for the country as a whole.

In return for its services, the voluntary hospital will receive from the joint authority payments for the services rendered, on a centrally determined scale. These payments will be *less* than the cost of the services; for if the payments covered the full costs, the hospital would lose its autonomy and simply become a joint-authority service. Part of the balance must be met from personal benefaction from those who believe in the voluntary hospitals. Part of it will be met by a grant from central government funds. If the hospitals wish, these central grants can be pooled and distributed to each hospital according to its needs.

What about hospital contributory schemes? Clearly, in so far as a hospital or part of a hospital is *not* covered by the area plan, it will be open to that hospital to charge its patients either directly or by a contributory scheme. But no patient will be unable to receive free hospital treatment, either in a joint-authority or voluntary hospital, because he is not a contributor. And the voluntary hospitals will not be able to make a "hotel charge" to patients admitted under the area plan.

The inclusion of the mental and isolation hospitals under the new joint authorities will enable them to take their proper place in a planned health service. The small isolation hospital should be a thing of the past. In addition to the large isolation hospitals serving densely populated areas, infectious-disease blocks should form part of the general hospitals.

Hospitals will benefit from *inspection*. Not only is inspection needed to inquire into difficulties or contemplated changes. Routine inspection at not too frequent intervals will bring to light defects of management, and keep individual hospitals in touch with the latest ideas and practice. The Minister's inspectorate, which could be appointed with the advice of the Central Health Services Council, might consist of whole- and part-time medical men and women, experts in both medical specialties and hospital administration, as well as non-medical hospital administrators, accountants, nurses, engineers and catering and kitchen experts. Some of

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the part-time doctors would be chosen from voluntary hospitals, and some from municipal hospitals. There might well be area panels of inspectors. The nucleus of such an inspectorate already exists in those doctors who have been making the Ministry's regional hospital surveys.

CONSULTANTS

Everyone must be able to obtain without charge, whenever and wherever he needs it, skilled specialist advice. The Government consider that a consultant service can best be based on the hospitals.

One of the duties of the joint authority will be to see that there is an adequate consultant service to meet the needs of general practitioners. It will do this partly by consultants based on its own hospitals, partly by those based on voluntary hospitals. This will be part of its area plan. The voluntary hospital will undertake to provide consultants both at the hospital and, where necessary, at clinics, health centres, and in the patient's own home. The hospital will make its own arrangements with the specialists. The payments made by joint authorities to hospitals will be based on the assumption that the consultants will be properly paid for this work. The Government are awaiting the report of the Goodenough Committee before making detailed proposals.

There are not yet enough real consultants, and more doctors of the right type must be encouraged to specialise. Means must be provided for their training. Distribution, too, is uneven. The consultant service will still need to be organised with medical teaching centres as its main foci, but consultants must be encouraged to live and work further apart. Not only will this help the public; it will also help general practitioners to continue their postgraduate education.

Consultants must be much more regularly associated with their particular hospital or hospitals—with more regular attendances and duties. It will often be desirable for them to work at more than one major hospital, as well as visiting outlying health centres, clinics, patients' homes, and "general practitioner" hospitals (*sic*).

Clearly, consultants will have to be paid for their work properly and regularly. Their agreements with their hospitals can be full-time or part-time. Terms and conditions will be matters for individual hospitals, whether municipal or voluntary, but to avoid anomalies between different hospitals and different areas some central regulation of remuneration will be needed. The white-paper makes no mention of the vexed question of hierarchy or parallelism in hospital medical staffing.

Ultimate responsibility for appointments to senior posts must rest with the hospital authorities. But to clinical avoid "in-breeding" there is much to be said for an expert advisory body to recommend a number of suitable candidates, from which the hospital authority would make the final choice. Such expert advisory bodies might be regional panels, based on medical teaching centres.

CLINICS AND OTHER LOCAL SERVICES

The new service will include arrangements for home nursing, health visiting, midwifery, maternity and child-welfare, and other special clinics. The joint authority will have to include these services in its area plan. As to who will run them, the general principle will be that those falling into the hospital and consultant sphere will be under the new joint authority, while those in the "sphere of general health" will, like the health centres, be under the county and county-borough councils. This will give the family doctor an increasing opportunity to be closely associated with the clinics—e.g., child-welfare centres.

All institutional maternity work, both for normal and complicated cases, will come under the new joint authorities. Maternity and child-welfare services will not be transferred to them, but will be under whatever are the new education authorities; these are likely to be the county and county-borough councils, though arrangements will be made in suitable cases to delegate much of the work to existing smaller authorities. The home midwifery service and the health visitors will be under the same authorities as the maternity and child-welfare services.

In Scotland, maternity and child welfare will continue to be under the county councils and councils of large burghs as at present.

The School Medical Service will remain under the education authorities. But, as soon as the new health service becomes comprehensive, it will take over the treatment of the school-children.

Tuberculosis dispensaries will become outpatient centres of the hospital and consultant service, under the new joint authorities. Isolation hospitals, as already mentioned, will also come under the new authorities. Notification and the local control of the spread of infection will probably lie with the counties and county boroughs. Outpatient mental and psychiatric clinics will pass under the new joint authorities. Cancer centres, as they develop, will also be a part of the hospital and consultant service under the new joint authorities. Venereal disease clinics are a border-line case: it may best be left to be determined in the settlement of each area plan.

Everyone who needs nursing attention in the home must be able to obtain it through the new service without charge. The county and county-borough councils will have to see that this is done; but it will have to be discussed as to how far they should provide it directly and how far indirectly through other bodies.

A full dental service, including regular conservative treatment, must be provided as a part of the new National Health Service. But for some years there will not be enough dentists to staff it. So, at the start, children and young people, and expectant and nursing mothers, must have priority. The Teviot Committee will in due course be reporting on the whole problem. Ophthalmic services must also be incomplete at first, for similar reasons; but this also is a practical problem to be overcome rather than an inherent difficulty. Details of the organisation and location of these two services will be discussed with the professional and other interests concerned.

FURTHER POINTS ABOUT ADMINISTRATION

Besides the Central Medical Boards (for England and Wales, and Scotland) employing the general practitioners, there will be a Central Health Services Council. It will be there to express an expert view on technical aspects of the National Health Service. It will be consultative and advisory, and not executive. It will be entitled to advise the Minister not only on matters referred to it by him, but on any subject within its province on which it thinks it right to express an opinion. The Minister will have to submit a report of the council's work to Parliament once a year, and he may publish its advice or views from time to time. But the Council will not, apparently, have the right to publish on its own account.

The Council will *not* be elected, but will be appointed by the Minister in consultation with the appropriate professional bodies. It will select its own chairman and regulate its own procedure. Its secretariat and expenses will be met from the public funds. It will represent in the main medical organisations, voluntary and publicly owned hospitals (with both medical and lay representation), dentistry, nursing and pharmacy. There will be a similar but separate council for Scotland.

It should be noted that the area plan to be prepared by each new joint authority is to be comprehensive. This should ensure that the services provided by the counties and county boroughs really do interlock with those provided by the new joint authorities. The Minister will have power to modify or supplement the plan; but

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whether he will lay down minimum standards—of, for example, the number of health centres to be provided in urban areas—is not stated. At any time the joint authority will be able to submit amendments to the Minister for approval. Both in preparation and amendment, joint authorities will consult with Local Health Services Councils. These will be local counterparts of the Central Health Services Council. Whether they will be appointed or elected is not stated, but they will have the right to advise the joint authorities and the county and county-borough councils without being consulted, and will also be able to advise the Minister direct.

FINANCE

Finance is discussed in an appendix to the white-paper. It is emphasised that the figures are based on incomplete knowledge, and must be regarded as tentative only.

At present £55 millions are spent from the public funds in England and Wales on the health services. It is estimated that the new service will cost not less than £132 millions. This will be divided as follows:

New joint authorities, on hospitals, consultants, &c., including payments to voluntary hospitals	£70 millions
County and county-borough councils, on clinics, health centres, home nursing, &c.	£22 millions
Central medical board and Ministry of Health, on general practitioners and chemists	£30 millions
Ministry of Health, direct to voluntary hospitals	£10 millions

How will the joint authorities and the county and county-borough councils get their money? Joint authorities will receive from the Treasury £100 per ordinary hospital bed per annum—but only £35 per bed in mental and infectious-disease hospitals, because of their lower comparative costs, and because local authorities already have to provide them. This will be "in aid of" both hospital and consultant services. (A similar grant will be paid to voluntary hospitals—the £10 million mentioned above.) The additional cost of the work of the joint authority will be met by precept on the constituent county and county-borough councils—that is, out of the local rates.

The county and county-borough councils will get a 50% grant from the state towards the cost of every new service, for example health centres. In addition, the state will give a grant to cover half the new increase in health services rate over a selected standard year. This grant will be adjusted to help poor areas more than rich.

It is estimated that, over all, the money will come from the following sources: Social Insurance Scheme, £36 millions; taxpayer, £48 millions; ratepayer, £48 millions.

In Scotland, the total cost is estimated at nearly £16 millions, to be spent, in round figures, as follows:

Secretary of State, on health centres and practitioner services	£3½ millions
New joint hospital boards	£8 millions
County and large burgh councils on clinics &c.	£3 millions
Secretary of State, direct to voluntary hospitals	£1½ millions

This money will come from: Social Insurance Scheme, £4·3 millions; taxpayer, £6·1 millions; ratepayer, £5·4 millions.

Appendices

The white-paper ends with 5 appendices. The first of these describes in detail the origin and development of the existing health service; in itself, it is a minor textbook of health organisation. The second deals with the events leading up to the present set of proposals. The third is concerned with possible methods of securing local administration over areas larger than those of existing local authorities. The fourth discusses briefly the principles on which remuneration of general practitioners should be based. The last is a fairly detailed account of the broad financial issues involved in the new service.

Special Articles

WAS INFLUENZA PANDEMIC?

CASUAL impressions of the extent of an epidemic can be misleading. When influenza is going round the phrases: "We've all had it" and "Everybody's going down with it" are common hearing, and suggest a gust of wind in a cornfield, bowing every head. In fact, most people escape. During the recent epidemic the British Institute of Public Opinion found that only 27% of the population had been *in bed* with influenza. In this investigation a cross-section of the adult population throughout the country were asked "Including yourself, how many people are there in your family living together?" They were then asked "How many of them have been in bed with 'flu this winter?" and also "How many have had complications (e.g., bronchitis, pneumonia) following influenza?" Complications, such as bronchitis and pneumonia, arose in about 1 in 5 of those affected, or 5% of the population. Variations between the different regions of Great Britain were slight:

—	In bed with influenza (%)	Complications (%)
London and Southern Counties	27	5
Midlands	26	5
Northern England	27	6
Wales	28	6
Scotland	25	4

A smaller proportion of the poorer people than of the remainder of the population took to their beds (25·6% against 28·1%) and complications were less common among them (4·6% against 7·1%).

The incidence seemed to be related to the size of the household, though not straightforwardly, as the following figures show:

No. in household	In bed with influenza (%)	Complications (%)	No. in household	In bed with influenza (%)	Complications (%)
1	28	9	5	26	5
2	27	5	6	27	5
3	23	5	7	29	6
4	26	4	8 or more	31	9

A more direct correlation might perhaps have emerged if the size of the household had been related to the size of house. The findings indicate further lines of inquiry.

MEDICINE AND THE LAW

Bequest for Psychological Therapy

BY archaic quibbles over the validity of "charitable" bequests the law imposes a heavy tax upon the funds bequeathed. *In re* Osmund is an instance of the legal uncertainty. Miss Osmund left money on trust for the medical profession "for the furtherance of psychological healing in accordance with the teaching of Jesus Christ." Last year the late Mr. Justice Bennett ruled that this was not a charitable trust. Miss Osmund had not made a complete disposition of the beneficial interest in her estate. Consequently the money passed to the next of kin. Recently the three members of the Court of Appeal have unanimously reversed his decision, the costs of all this litigation being deducted from the estate.

To explain to the court the meaning and scope of psychological therapy, an affidavit by Dr. C. M. Hinds Howell was submitted at the hearing last year. The deponent could offer no information on the divine guidance referred to by Miss Osmund, but he could properly affirm that psychological healing was well known and recognised in the medical profession and is embraced in the well-recognised practice of psychotherapy. It involves discovering the mental factors which cause symptoms of physical or mental distress or nervous and emotional disorders; it helps the patients to readjust themselves and so to be restored to health

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without surgical treatment. The affidavit named hospitals and clinics which specialise in such treatment. Mr. Justice Bennett, however, did not feel happy about the absoluteness of the discretion given by Miss Osmund to her executors. Suppose, he said, that a millionaire suffered from chronic dyspepsia and that the medical profession, aided by money furnished by Miss Osmund's trustees, sought to heal the patient by psychological treatment. That would be within the unfettered discretion of the trustees; but the court could not accept the view that it would be an application of Miss Osmund's estate for a charitable purpose. Where it is open to executors to apply part of a bequest to non-charitable purposes, the gift is not a valid charitable gift even though the greater part of the purposes were charitable. Happily the Court of Appeal, while not disputing this statement of the law, has found a way round. The bequest, says the Master of the Rolls, was not "for provision of psychological treatment," but "for furtherance of psychological healing." It was thus, in his opinion, a valid charitable bequest to the medical profession generally to advance the art of psychological healing.

Psychological Surgery

A singular development of psychology, recorded in the plea of a recent defendant at the Old Bailey, takes us to a form of treatment which neither the Court of Appeal nor Miss Osmund is likely to have contemplated. Dr. Alfred Hugh Bell, practising at Hanwell, was indicted for using an instrument upon four different women with intent to procure their miscarriage. According to the prosecution, all the women were pregnant. They visited Dr. Bell and told him of their condition. At their first and second visits they were given medicine and were told that, if this had no effect, they were to return in a few days' time. At a third visit, it was alleged, he used an instrument. In one case Dr. Bell charged a fee of three guineas; in the others his fee was 2*s.* 6*d.* a visit.

The prosecution, of course, had to establish that the accused practitioner used the instrument with intent to procure a miscarriage. Dr. Bell, in the witness-box, admitted prescribing medicine for the women; it was, he explained, a tonic. He also admitted using an instrument, but said he wanted the patients to believe that he was procuring a miscarriage though he himself had no such intention. His object was to deter them from interfering with themselves or going elsewhere to an abortionist. His treatment, he said, was "really of a psychological nature"; he used the instrument in such a way that no harm resulted.

Dr. Bell was acquitted.

Tuberculosis as an "Injury"

The long forensic fight to establish that disease may be an accident or injury for the purpose of workmen's compensation ended long ago. The victory has now been followed up in a dispute over a police pension. Mr. Denis Garvin joined the City of London police force in 1939, being then in perfect health. The air-raids on London caused him to spend long hours on duty without regular meals and exposed him to cold, wet, and physical and mental strain. Eventually he was found to be suffering from pulmonary tuberculosis. The Police Pensions Act of 1921 entitles a constable to retire on medical certificate and receive a special pension for life if he is "incapacitated for duty by infirmity of mind or body occasioned by an injury received in the execution of his duty." The police authority refused his claim that the tuberculosis was an injury qualifying him for the pension. The risk of tuberculosis, it contended, was common to mankind and not peculiar to constables on duty; injury, it argued, must be distinguishable from disease and must be something which could be identified as having happened at some particular place or time. The analogy of workmen's compensation law was discussed. Quite apart from the cases about lightning or heatstroke it has long been established that the element of fortuitousness must not be over-emphasised. In Brintons Ltd. *v.* Turvey it was held in 1905 that when an anthrax bacillus flew out of a bale of wool into a wool-sorter's eye and infected him so that he died, the death was due to an "accident." "It does not appear to me," observed Lord Halsbury, "that, by calling the consequences of an accidental injury a disease, one alters the nature of the injury." Applying this line of thought, the High Court has held that the constable is qualified for his pension. There is no need to identify any particular event as the accident. A bacillus causes tuberculosis, said Mr. Justice Humphreys; medical men speak of a tuberculous lesion; the word "lesion" means injury.

In England Now

A Running Commentary by Peripatetic Correspondents

A leading social worker who has over 20 years special experience with children told me flatly that she has only once seen a child genuinely and directly benefit from treatment at a child-guidance clinic; all her colleagues, she added, agreed that psychiatrists would not coöperate with social workers whom they appear to despise. Again, social workers agree that the psychiatrist is biased against the parent—"the child is always right." Thus they create new problems. Parents are not led to appreciate the proper function and methods of the clinic, a word they associate with bottles of medicine. A mother recently asked a thirteen year old what he had done there, and felt somewhat aggrieved when the reply was, "I only played ludo with the doctor." He and other young adolescents, incidentally, strongly resented this type of investigation which they considered too juvenile and therefore derogatory.

My friend wants parent-guidance clinics, and is convinced that these, if well run, would make child-guidance clinics redundant. She was careful to insist that the psychiatrists should be called in for diagnosis, but, once it was decided that the child was not a genuine psychopath, it was then for the parent to report at regular intervals and receive instruction. As the father of three ordinary youngsters, I often feel I could do with a bit of guidance myself.

* * *

A WHITE PAPER ALPHABET

A's for Appendices—*must* they be read?
B for the man who brought things to a head.
C's for the Centres, to spring from the ground?
D for the Dentists who cannot be found.
E's Expectations will not be fulfilled:
F for the Fears that are equally killed.
G for Group practice—gets blessing episcopal.
H for the Hospitals—vol. and municipal.
I's Isolation, no longer so "splendid."
J for Joint boards, not elected but blended.
K are the Kids who'll at last get attention.
L's L.s.d.—has an "honourable mention."
M's Misconceptions and M & CW.
N for the Nexus of cash which won't trouble you.
O's for the Oratory, daunting the boldest.
P the Profession—most learned, not "oldest."
Q are the Queries, there'll be quite a lot.
R the Restrictions on where you may squat.
S for the Scots—those still north of the Tweed.
T for T.b. beds, of which we're in need.
U's Ultramontanes who'll doubtless object;
V for the Votes they will try to collect.
W stands for the man who'll be pleading it.
X the Exhaustion I feel after reading it.
Y for the Young men away at the wars:
Z for the Zeal we should show in their cause.

* * *

Some months ago I was ordered to inspect a hospital from boiler house to theatre (frankly, because there was no-one else available to do the job), and though I felt incapable of making any really useful report "orders is orders." It seemed a very nice hospital with plenty of good-looking nurses and all sorts of latest devices and rehabilitation gymnasia which were completely new to me. But the medical superintendent was not specially interested in any of this stuff. His energy and attention were focused on his arrangements to ensure that the food from the central kitchen was served hot at the bedside in distant wards. Difficulties about staff, routes, transport and equipment, and how they were surmounted, were explained to me in the greatest detail. I was soon satisfied and indeed began to be bored. When I was manœuvred into taking the temperature of a stew, accompanying said stew in a hazardous career hurtling

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across the grounds on an odd electric bogey, and taking its temperature again on a soldier's plate, I regarded this as a work of supererogation.

I misjudged that elderly super. He was right to leave the gleaming theatre gadgets to his surgeons, and rehabilitation to the mysterious practitioners of that craft, while he got on with Important Things. I soon realised this when I landed in hospital myself. It was a good place, bright, cheery and comfortable; the nursing was all one could ask, and the medical staff were almost entirely from my own medical school. But the food was always tepid; even the tea was never hot. Had the dietary set out to be cold, one would not have minded, but the meals were meant to be hot. Anorexia did not improve matters. Though the meals were varied and generous I ate less than a quarter of the portions and was consequently slow in picking up strength. Nothing could be done about this tepid service without shaking the hospital to its foundations, and I felt in no shape to inaugurate revolutions. What really worried me was that the medical staff did not know that the meals were constantly unattractive because they were neither hot nor cold, and worse, the nurses regarded it simply as an act of God.

* * *

A small token sum changed hands today, when "envisage" at last appeared in *The Lancet*. We knew it had to come, but there was a sporting chance about when it would. What with statesmen and leader writers, a Great Daily lately used it four times in one issue. Fowler objected to it—in "the prospect of a general strike was cheerfully envisaged"—as a long word when a short one would do, the short one being "faced," and Keats wrote "envisage circumstance, all calm," or, as the idiom of today would put it, "face up to it and not get windy." It seems to mean looking at, or visualising, or expecting something that calls for courage, just as Manstein might envisage a nasty jar by Timoshenko. But now all of a sudden we envisage anything from a Beveridge plan to a pint of beer; the Great Daily has just told us that a parliamentary bill envisaged something or other—I forget what, and it doesn't matter. It is an ugly word and awkward to say; its perverted meaning is dubious, and leaves us guessing whether the plan or pint is offered for consummation or consumption or whether someone is having a day-dream. A great advantage, this, in the world of high politics, but I hope we shan't take the brat to our professional bosom. If we do, our biochemists might tell us they have envisaged a new plan for producing their mouldy remedies, or the psychologists a fresh way of enucleating a complex. Then the obsessional semanticist (that's me) will get bothered about what the experts think they have to face up to. (Let me remind you, Mr. Editor, that Fowler defended the preposition at the end of a sentence, so sucks to you.)

We have already taken to our bosom that other monstrosity, "following," so steadfastly used by some writers in place of "after" or "because of." "The enemy retreated following an outflanking move" is a type specimen and describes (or envisages) an impossible military manœuvre. We doctors, however, can beat that, as in a specimen I once collected where a man went into hospital following melæna. He may have been going after a nice girl with a nasty name, but I don't think so. "Following the operation the patient became very restless" prepares us to read in the lay press that someone has died following an operation; the next step should be for a busybody to envisage a bill to put following operations on the schedule of dangerous trades. "Prior to" is another general favourite, less offensive than "following," and enables us to avoid using "before." I haven't yet been asked whether the medicine should be taken prior to or following meals. But it will come, and I really and truly envisage it with dislike.

* * *

We came down the steps to the waiting ambulance slowly. The "sick-on-leave" had the paper parcel containing his small kit tucked under one elbow, and I supported the other. Ten minutes ago the road had been deserted. Now there were twenty or more children circulating noisily round the ambulance, fingering the sides, poking the tyres and even trying to let down the steps at the back (a feat not to be accomplished without practice). It was Saturday, a school holiday, and here (it seemed) was a heaven-sent diversion. I did not blame them; but I prayed that none of the smaller fry would camp beneath it before we moved off. The chattering diminished as we descended the steps, the spotlight focused on us mercilessly, and for a minute there was quiet. Then a stage whisper inquired whether that was a lady doctor. "No"—the reply came from a sturdy *circa*-6-year-old, evidently in authority—"No, she's a soldier." In support of his authority I hid my stethoscope behind my back as I advanced. "She's a—She's a—general." He went on, a little puzzled and probably wondering why so important an officer should visit so unimportant a place. "She's got three pips and a crown, she *must* be a general." By that time I had climbed up beside the driver and was eager to be removed from the range of further speculations. As the engine started a tousle-headed imp of insatiable curiosity emitted a shrill pipe. "It isn't three pips and a crown, Tommy, it's three pips and a *button*." And then we departed; a poor exit, I thought.

Parliament

ON THE FLOOR OF THE HOUSE

MEDICUS MP

THE list of amendments to the Education Bill grows. Up to the present Mr. Butler has been conciliatory on the presentation of a case for an amendment—for example that on the provision of premises in schools for the cooking and serving of school meals—and he has announced that he has power to deal with this under such and such a clause and that he intends to use that power. This is not binding in the same way as an alteration of the wording of the bill, but ministers rarely go back on such an undertaking. The member moving the amendment then asks leave to withdraw and the debate proceeds to the next section or clause. A number of the medical amendments appear in the names of members of the Medical Parliamentary Committee, of diverse parties. The committee, by the way, have now decided, after consultation with Mr. Speaker, to change their title to Medical Parliamentary Group to avoid any mistake as to their standing. As a purely non-official body the group is not entitled to represent itself as expressing official Parliamentary opinion. It enjoys an equality of status with other bodies such as those which deal with conditions in the Services, or foreign policy, and it can be influential as a focus of opinion, which it can express through the speeches of its members or by deputation to and discussion with a minister.

The white-paper on *A National Health Service* has at last appeared. The delay in publication seems to be justified by the document's cordial reception in the House. The proposals put forward by the Minister of Health represent the opinion of the Cabinet and will be seen in perspective if it is realised that they are part of the Government's proposals for social security. The outline of a complete service is set out, but it is one which gives alternatives and is not a fixed mechanism. It is a growing organism rather than a rigid structure. Young men returning from the wars will have a wide choice before them in hospitals, in clinics, in a public-health service, in group practice, as salaried workers, or in private practice as individuals. The voluntary hospital remains, but it will be coördinated with the publicly owned hospitals in a regional service. Strictly private practice, apart from panel practice, will continue, but members are wondering how much of that kind of private practice there will be in the postwar world anyway. And workers on all sides welcome the guiding idea that all medical services shall coöperate to cure and to prevent, but more than all that personal health is to be regarded "as something to be positively improved and promoted and made full and robust." In the variety of our hospitals we have in this country an unequalled foundation. Add to this the consultant and specialist services freely available to all, a complete family doctor service and we should have in a few years a comprehensive and unified service as good as any in the world and probably better. Medical colleagues in the Soviet Union and the United States please note!

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It is the intention of the Minister of Health to give time for the digestion of the white-paper before it is discussed in the House, and there will be a further interval after this before any bill is introduced. The proceedings will be measured in months and not weeks of parliamentary time. The medical profession and local authorities will need time to discuss principles and details. Despite the formidable programme of work in front of Parliament and the profession, the proposals are likely to prove acceptable, and when consultations and discussion are finished the House will be ready to place a new act on the Statute Book setting up a health service for the nation.

FROM THE PRESS GALLERY

Orr Report

ON the motion for the adjournment in the House of Commons on Feb. 16, Major S. F. MARKHAM complained that the Department of Health's scientific advisory committee under the chairmanship of Sir John Orr in its inquiry into the causes of the rise in infant mortality in Scotland had confined itself to pre-war conditions. The House of Commons was under the impression, he said, that the committee would go into the subject right up to date. Changes in diet, housing, employment, medical services, and so on, had had a profound effect during the war years, and it would have been of assistance, not only to Scotland, but to the Empire, if the Orr Committee had carried out its terms of reference as the Secretary of State for Scotland had announced them to Parliament. Major Markham suggested that the Secretary of State's statement in his foreword to the report that "for the first time all the known comparisons are carefully marshalled" was untrue. There was no detailed comparison with other countries, including Iceland and the great American cities. Moreover, the statistical basis of the report was poor, and there were crude errors in it. There was no mention of the new Simpson Memorial Hospital in Edinburgh, which had air-conditioned wards, nor of *Infant Life* issued by the American Children's Bureau and possibly the most important publication in America dealing with infantile mortality. The report should, he thought, have given some attention to environmental conditions, including smoke and fog. The Americans had tackled this problem by air-conditioning, and had made a success of it. Another important point was warmth for the mother and child, and the ideal temperatures—70–75° by night and day—were several degrees higher than those in the average Scottish home. Major Markham suggested that all premature infants should be reported within an hour and brought in electrically-heated ambulances to hospital and placed in scientifically-heated wards or incubators; nurses should be specially trained to deal with premature infants on the lines developed in Chicago, clinics and infant welfare services should be improved by making them clean, warm and comfortable; a committee of non-medical men should be set up to study the environmental factors in infant life, and a national campaign for adolescent and expectant mothers on the lines of the Chicago campaign should be instituted. The Secretary of State should break down the old fallacy that the Scots were a hardy race. Their infantile mortality was higher than in almost any other part of Europe. Their expectation of life was four years less than the average Englishman's and their death-rate was higher. Every year 5000 Scottish children died from dirt, cold and ignorance.

Mr. T. JOHNSTON, Secretary of State for Scotland, in reply said that the Government's promise to afford facilities for an adequate discussion in the House on this subject would be kept. After citing the personnel of the Scientific Advisory Committee and the Orr Committee itself, Mr. Johnston submitted that nobody could have chosen more eminently qualified persons. From his point of view it would have been desirable for the committee to analyse war-time trends, because the trend was going down. Last year Scotland had the lowest infant mortality in her history—65 per 1000. The reason why they did not do so was the difficulty of getting accurate statistical data in war-time. The committee did contain members who were familiar with conditions abroad. Great care had to be taken, however, in using foreign, colonial and Dominion comparisons. It was true that the New Zealand figure was 29, but that figure excluded the Maori figure, which was 97. In July 1939 the unemployment figure in Scotland was 11·5; in January 1944 it was down to 1. He believed that one of the causes of the reduction in infant mortality was the bigger income coming into the home. A great deal was being done to tackle the problem. The number of maternity homes had risen by 50%—a big figure in war-time. It was true that there were 108 other maternity beds which were now being put to war-time uses, but if the women of the country wanted the use of those beds they would get them. The local authority associations were doing all they could by increasing the intakes of orange juice and vitamin tablets, and by requisitioning more of the large houses in particular areas. It being half an hour after the conclusion of business, the Deputy Speaker then adjourned the House.

National Health Service

The MINISTER of HEALTH, in announcing the issue of the white paper on the national health service on Feb. 17 informed the House of Commons that the proposals were those which the Government believed to be best calculated to achieve an efficient and comprehensive service. But they were proposals—not decisions—and the Government had promised that they should be discussed with all concerned and would welcome constructive criticism in Parliament and the country.—Mr. EDEN, Leader of the House, said that it was certainly the Government's intention that there should be a debate as soon as members had had a full opportunity of examining the proposals.

QUESTION TIME

Infant Mortality in Scotland

Major MARKHAM asked the Secretary of State for Scotland what was the infantile mortality rate for Scotland for 1943; and the latest comparable rates for Iceland, New Zealand, New York and Chicago.—Mr. JOHNSTON: The infant mortality rate for Scotland for 1943 was 65 per 1000 live births. The latest figures available for the other places are: New Zealand (1942: Europeans) 29; New York City (1940) 35; Chicago (1940) 29; Iceland (1936: rate calculated by USA) 48.

Major MARKHAM asked the Minister whether any member of the Orr Committee on infantile mortality visited any area outside Scotland or London in connexion with the committee; whether any attempt was made to interview and ascertain the opinion of scientists outside the medical profession; and whether any attempt was made to secure recent information on the methods of dealing with infantile mortality in Iceland, Chicago, New York and Los Angeles, other than through the children's bureau at Washington.—Mr. JOHNSTON replied: The chairman of the committee informs me that the committee did not make any visits, nor take any oral evidence during the course of their inquiry, but that they obtained and studied all information which they considered necessary for the purposes of their remit.

Silicosis and Pneumoconiosis

Mr. JAMES GRIFFITHS asked the Minister of Fuel and Power how many miners have had to cease work at the mines in the past six months in consequence of being certified under the silicosis and pneumoconiosis orders; if he was aware of the concern felt at the increase in the number of men so certified; and what steps were being taken to prevent the increase of this disease among miners.—Major G. LLOYD GEORGE replied: The number of workmen who have been certified by the medical boards for total or partial suspension in the six months ended Dec. 31 is 819. It does not follow, however, that all these men have left the industry. The increase is due almost entirely to the extension of the compensation scheme last July which brought sufferers from pneumoconiosis within its scope. A number of expert committees, in addition to my own specialist inspectors, have the prevention of those diseases constantly under review and, on their advice, I have made an order conferring upon the inspectorate the power to require appliances to be installed for the suppression or extraction of air-borne dust below ground. This order applies to South Wales and came into operation on Jan. 1.

Production of Penicillin

Major A. M. LYONS asked the Minister of Supply to what extent he was coöperating with the appropriate authorities in Canada and in the USA in the large-scale manufacture of

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penicillin.—Mr CHARLES PEAT replied: There is close and constant coöperation both by the exchange of information and reports and by visits of scientific and technical experts. The arrangements for the production of penicillin in Canada and the United States and this country are coördinated by the Combined Production and Resources Board.

Major LYONS: In view of the uneasy feeling among the public that a monopoly has been granted for the manufacture of this drug and that we are not pressing ahead in any degree in the manufacture of it, will the Minister say precisely what steps are taken to coöperate in the large-scale manufacture now taking place in Canada and the United States?—Mr. PEAT: To answer the question in detail would take some time, but as far as I know no step is being omitted which would help us to get production in this country.—Major LYONS: But what step is being taken?—Mr. PEAT: We are in the closest coöperation with Government bodies in the United States and Canada and with all scientific bodies in those two countries.

Letters to the Editor

CHECKING THE GAS

SIR,—The council of the Medical Defence Union is at present actively engaged with the Association of Anæsthetists in a review of certain difficulties experienced by anæsthetists with respect to the recognition of the actual gas (or gases) delivered to and from anæsthetic apparatus. It is hoped that it will prove practicable in the near future to submit to your readers a full report on the measures proposed by the above bodies for adoption by those concerned to obviate errors of wrongful coupling or of misidentification of the gas (or gases) in use.

For the present all anæsthetists, of whatever experience and qualification, are urged to satisfy themselves personally of the actual gas about to be administered to a patient and not to rely upon the assurances of other parties. The factor of personal responsibility should never be absent from the mind of an anæsthetist, with the result that before commencing the administration of any gas or mixture of gases he should check his apparatus and cylinders completely to satisfy himself beyond reasonable doubt on the character of the gaseous anæsthetic he proposes to administer to a patient.

ROBERT FORBES,
Secretary.

Medical Defence Union, W.C.1.

DIPHTHERIA IMMUNISATION

SIR,—The following seems a striking example of the effect of APT in the prevention of diphtheria.

A female landworker and milker, aged 19, in a rural district was notified as suffering from diphtheria and taken to the isolation hospital. She had not been immunised. Nine people were living in a semi-detached house of two living rooms, a scullery and three sleeping rooms. Sanitary arrangements were good. Influenza was prevalent in the family and neighbourhood.

A brother aged 10 years had a thick purulent discharge from his left ear with a history of ear trouble off and on since infancy. The bacteriological findings were these. *Ear swab:* an organism morphologically resembling *C. diphtheriæ* present; on further investigation this proved to be a virulent strain which produced typical lesions in an inoculated animal (an area of hæmorrhagic œdema at site of inoculation, swollen and congested regional lymph-glands, marked swelling and congestion of the adrenal glands); no hæmolytic streptococci recovered from the ear. *Throat swab:* negative for *C. diphtheriæ* and hæmolytic streptococci.

Nose and throat swabs of the other inmates of the house were also negative for *C. diphtheriæ* and hæmolytic streptococci.

Two brothers aged 17 and 15 were completely immunised with alum-precipitated toxoid (Wellcome) at the same time as this ten-year-old boy, 3 years previously. A sister aged 2 years was immunised a year ago. No further notifications have been received. The school the boy attended shows 100% of completely immunised children.

This boy was probably a carrier; a smouldering fire, fanned by an influenza breeze, bursting into a fierce flame, infecting the unprotected young woman, leaving unscathed the immunised contacts.

W. W. NUTTALL.

Sandgate, Kent.

PATULIN AND CLAVICIN

SIR,—In the course of experiments (*Nature, Lond.* 1942, **149**, 356) one of us discovered a bactericidal substance in the culture medium of certain strains of *Aspergillus clavatus*. The bactericidal fraction was found to be active against a great variety of organisms, and a joint study of it was subsequently made in some detail by Kaplan, Rabinowitch and others. American workers (*Science*, 1942, **96**, 202; 1943, 98, 282) also contributed to the knowledge of this agent for which the name "clavicin" was proposed. It now appears that the recently discovered patulin is identical with the clavatus agent (Bergel et al. *Nature, Lond.* 1942, **152**, 750). If that is so we would suggest that the same caution is observed in the use of patulin as we have found necessary in the case of clavatus extracts. Active cultures of *A. clavatus* are toxic, as are also pure compounds of the active fraction. The mildest and most harmless manifestation of toxicity in human subjects is vomiting, while in animals sublethal doses produce severe pathological changes. Clinical experiments suggest that clavicin may prove useful: for example, excretion of the active agent through the kidneys sometimes sterilises the urine in cases of long-standing infections which have proved resistant to sulphonamides and other drugs; and it may also be helpful in combating seminal infections. But while animal experiments and clinical observations amply justify further research in this subject all future experiments should be carried out with due respect for the toxicity of the agent. If the recent claims by Bergel and his colleagues are confirmed the same need for caution will be necessary in the case of patulin. This view receives further support from a communication by Chain and others (*Lancet*, Jan. 22, p. 112), in which patulin is identified with claviformin, which is produced by *P. claviforme*. These workers, too, draw attention to the toxic nature of the compound.

We wish to thank Mr. H. W. S. Wright and others for placing at our disposal their observations on the clinical results obtained with clavatus extracts.

KENNETH WALKER.
B. P. WIESNER.

London, W.1.

ACID PHOSPHATE FOR FLATULENCE

SIR,—It is generally agreed that intestinal flatulence is a most intractable condition and affects large numbers of persons, especially at present when the diet is for many not their usual. In the course of experiments carried out for another purpose I have observed that the injection of phosphates, acid or alkaline, have a remarkable effect on the intestine if injected intravenously or into the lumen. There is a marked dilatation of the vessels of the gut, which develops a flushed appearance, and commonly there is a gross exaggeration of peristalsis, sometimes visible through the abdominal wall.

I have had an opportunity from time to time during the last few years of applying these findings to clinical cases. In cases of abdominal discomfort due to the accumulation of gas in the intestine sodium acid phosphate (NaH_2PO_4), in doses of 15 grains (that is as much as can be placed on a sixpence) three times a day, acts almost as a specific. As a physiologist my experiences have been limited to my friends, but it has been found valuable in some 10 cases of flatulence of unknown origin, in that commonly associated with gallstones (a personal experience), and in 2 cases of pain associated with duodenal ulcer which has been diagnosed by X ray. In the ulcer cases, I must confess, I advised the treatment with trepidation, but the two subjects (one of whom was a chemist) had been in discomfort for so long that they were willing to try anything—even after I had explained the risks. The general improvement in the appearance of the patients was quite noticeable. They lost their typical "pale, pasty" appearance. All the patients have been loud in their appreciation of the treatment.

Although the treatment is so successful the exact reason is not clear. It may be that the phosphates have a specific action on alimentary activities. This is suggested by the experiments mentioned above, and it may be recalled that Tyrode in 1910 found that the solution which was best for the study of isolated intestine contained phosphates in addition to the usual elements of Ringer's solution. On the other hand, the acidity of the

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substance may be concerned, for the alkaline phosphate, although quite effective experimentally, is not so effective clinically, while old textbooks of medicine emphasise that flatulent dyspepsia is associated with an alkaline phosphaturia. It may be that the increased acidity promotes the digestibility of the starch, as pointed out by Hurst and Knott in regard to the HCl of the stomach, or it may be that absorption of calcium is promoted. No doubt many of the patients were suffering in part from the excessive use of the commonly advised alkalis.

The research is being continued as opportunity occurs, but in view of the present alkaline diet which we consume the subject has a considerable practical importance.

King's College, W.C.2. R. J. S. McDOWALL.

LOCAL CHEMOTHERAPY IN EYE INFECTIONS

SIR,—I was glad to see a reference in your annotation of Feb. 12 to the possible value of a mixture of proflavine 0·1% and sulphathiazole 5% in ophthalmology. Proflavine, 1 in a thousand, in the form of drops, is a most efficient prophylactic in the conjunctival sac, and I have now used it in all operation cases for four years. It is absolutely non-irritating—Russell and Falconer (*Brit. J. Surg.* 1940–41, **28**, 472) found that a buffered isotonic solution of proflavine was no more irritating to the surface of the exposed brain than normal saline, whereas other antiseptics applied in the same way caused a severe hæmorrhagic necrosis. In the anterior chamber of the eye it has no damaging effect on the iris and does not cause iritis, but its effect on severely inflamed tissue is very limited. It is here that sulphathiazole, 5% in ointment form, is of great value, and infections of the external eye due to the streptococcus, staphylococcus, pneumococcus or gonococcus disappear after a few applications. Hypopyon ulceis of the cornea seem to respond more readily to this ointment than to the usual method of carbolisation and it is no uncommon thing for them to clear in four days. In making up this ointment it is important to see that the crystals of sulphathiazole are ground up very small, otherwise some irritation may result.

Sulphathiazole 5% and proflavine 0·1% combined in ointment form makes a useful application for general ophthalmic use.

Harley Street, W.1. SEYMOUR PHILPS.

CONSERVATIVE TREATMENT OF THE SEPTIC HAND

SIR,—As casualty officers we have had the opportunity of treating a large number of septic fingers and hands by the following method, and have been greatly impressed with its efficacy, both as a means of reducing the length of incapacity and of minimising the disabling after-effects of these infections. The principle underlying the treatment is, of course, not a new one. Since it eliminates the necessity for general anæsthetics, general practitioners may be tempted to try it for themselves. In brief, the treatment is as follows:

1. Immediate and complete immobilisation of the hand and wrist by means of a plaster-of-paris slab applied to the aspect opposite to that on which the pus would be expected to point—i.e., to the dorsum in an infection of the palmar surface. We have found that this is better than trying to immobilise a single digit, an anatomical impossibility except for the thumb and index finger. The slab is quickly and easily applied, and comfortable to the patient, who also wears a sling for the affected arm.
2. Sulphanilamide by mouth, 2 g. stat. and 1 g. four-hourly for 48 hours. With a short course the toxic effects are absent, or slight and transitory. The course is never continued without doing a white-cell count, and a 48-hour course has been found effective. In a considerable number of cases, where treatment on these lines has been instituted early, the swelling and tenderness have disappeared without pus formation.
3. When localisation occurs, no surgical intervention is carried out until pus becomes visible beneath the horny layer, and then a superficial nick is made through this layer only, without general or local anæsthesia. This operation causes the patient no pain.
4. To encourage drainage, sodium sulphate paste is applied to the opening. Drainage is satisfactory and rapid if immobilisation is continued. The plaster is removed only when there is complete absence of tenderness round the affected part.
5. Tonics, vitamins and sedatives are given as indicated by the general condition of the patient.

Heat is never used for septic hands, because we have found that the "cooked" hand takes longer to subside.

It has not been possible to compile a comparative series. Infected fingers and hands come to the hospital in all stages of maturity, and variations in the patient's general condition, as well as in the type of infection, make exact measurements difficult. During the past five months nearly all cases of infected hands attending the casualty department have been treated in this way. Among these there have been no amputations, and in every case function has been fully restored. The only exceptions to this method have been cases sent to hospital already incised, and by comparison we have found that the conservative treatment shortens the period of pain and incapacity, gives excellent functional results, and incidentally reduces the work of the department.

This method is worthy of being tested on a larger scale and should in time make the orthodox but too often mutilating incisions unnecessary in any but the exceptional case.

MARY E. EGERTON.
Royal Northern Hospital, N.7. BEN T. BOWEN.

VITAMIN-C NUTRITION

SIR,—Dr. Prunty and Dr. Vass in their timely article of Feb. 5 state that they have not seen an increase in scurvy in London since the war. In my experience there was no increase up to Spring 1943 (*Lancet*, 1943, ii, 160) but there has been more scurvy since, although only in feckless aged folk. Difficulties in shopping and worry over the fate of relations have led to self-neglect, and made it easier for old-age pensioners to become scorbutic. If Dr. Prunty and Dr. Vass see less of this type of patient than I, the discrepancy is explained.

Recent published work on blood ascorbic acid raises some questions. Is the most accurate index of vitamin-C deficiency the amount of vitamin C in the white-cell-platelet layer? Does whole blood reflect the state of vitamin-C nutrition more accurately than plasma? (Butler, A. M. and Cushman, M. *J. clin. Invest.* 1940, **19**, 459). What are the accepted normal values of ascorbic acid for whole blood and the white-cell-platelet layer?

St. Andrew's Hospital, Bow. ELI DAVIS.

SCHOLARSHIPS FOR NURSES

SIR,—Brief reference was made in your issue of Feb. 5 to the Hospital Saving Association scholarships for nurses. The HSA are to be congratulated on their long-sighted view, and on this practical help, from which their members and the sick public in general will benefit. Nurses welcome the interest of doctors in these scholarships, and hope they will encourage suitable sisters to apply for them. If the recommendations of the recent Horder report are to be implemented many more sister tutors will be needed. To nurses interested in public health, no less than 20 scholarships are available, including 4 for midwife teachers.

E. COCKAYNE,
Royal Free Hospital. Matron.

TOXIC REACTIONS TO SODIUM DEHYDROCHOLATE

SIR,—Soon after my first publication of the decholin method for estimating the circulation-time (Winternitz, Deutsch and Brüll, *Med. Klin.* 1931, **27**, 986) Winkler of Bucharest reported adverse effects in a few cases, consisting of collapse and fluctuations in pulse and blood-pressure (*Ibid*, 1932, **28**, 83). This is the only report of such effects which has so far come to my knowledge, although more than 160 papers have since appeared on the use of this method. My own experience (*Ibid*, 1932, **28**, 831) consists of roughly 2000 injections given or supervised by me or reported to me. There were 3 instances of non-fatal collapse, which is about the number one would expect after speedy injection of any anisotonic and anisosmotic solution, particularly in collapsed patients and patients with terminal heart-failure in

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which the method has been extensively used. Dr. Leys in his letter of Feb. 5 does not refer to the actual state or underlying condition of the patient in whom the injection proved fatal. It appears likely that the cause of such incidents is not the particular substance but the rapid intravenous injection, which unfortunately is the same in all clinical methods of arm-to-tongue circulation-time estimation. Other adverse effects are nausea and vomiting, which we have seen in a few sensitive persons. Personally I have almost abandoned the method in favour of the calcium method, in which 5 c.cm. of 20% calcium gluconate or 10% calcium chlorate is used. Calcium is more easily obtainable, cheaper, pleasanter for the patient and gives additional valuable information in peripheral vascular disorders. Perfect intravenous technique is, of course, essential in using calcium chlorate.

Stratford-on-Avon. MAX WINTERNITZ.

Obituary

FRANCES IVENS KNOWLES

CBE, MS LOND, CHM LPOOL, FRCOG

Mrs. C. M. Knowles, who died in Cornwall on Feb. 6 at the age of 73, was until her marriage in 1930 well known, as Miss Frances Ivens, for her work as gynæcological surgeon to the Stanley Hospital, Liverpool, and as commandant of the Scottish Women's Hospitals on the Aisne during the last war. Born at Harborough, near Rugby, she qualified from the Royal Free Hospital, London, in 1900 as gold medallist in obstetrics. Even as a house-surgeon she stood out among her colleagues for the quality of her work and her quiet assurance, and after postgraduate study in Vienna and Dublin and resident appointments at the Elizabeth Garrett Anderson and Canning Town Mission Hospitals it became clear that she was fitted by temperament and knowledge for the highest surgical post available. In 1907 she left London to start a gynæcological department at the Stanley Hospital in Liverpool. Here her energy and enthusiasm soon attracted many patients and her unremitting care and skill won their devotion. She was in due course appointed to the staffs of the Liverpool Maternity Hospital, the Samaritan Hospital, and lecturer in clinical obstetrics and gynæcology at the university. A good teacher, especially on the practical side, she was always anxious that even the most junior should work up to the limit of their capabilities. With her energy and persuasive powers Miss Ivens took an important part in planning and raising money for the new maternity hospital and in the formation of the Liverpool and District Women's Radium League. Her services were recognised within and without the city by the honorary degree of the ChM from the university in 1925 and the CBE five years later.

Through her work in Liverpool and later as president of the Medical Women's Federation Miss Ivens did much to make women's place in surgery acceptable. But it was during the last war that she achieved her great success as head of the Scottish Women's Hospital unit which went out to France in December 1914. She and her staff converted the ancient Abbaye de Royaumont into a military hospital of 100 beds. Soon, through the excellence of her work and the general efficiency of the hospital, it was attached to the French Army and the number of beds increased to 600. At the request of the military authorities she started another advance hut hospital at Villers-Cotterets and in March, 1918, was operating there under shell-fire till the German advance forced a hurried evacuation to Royaumont. She remained as head of the base hospital till February 1919. During these years Miss Ivens worked indefatigably, often operating for thirty-six hours at a stretch during pushes, yet always ready to receive and converse in their own tongue with préfets and generals. She had in fact a command of herself and others that came from knowledge and capacity and she made a great impression on the French. She was appointed chevalier of the Legion of Honour and awarded the croix de guerre with palm and the médaille des épidémies. She never lost her love for France and spent many holidays there visiting old friends and blessés. Propaganda work for the Friends of France was occupying her just before her death.

"Royaumont, an auxiliary hospital of the French army staffed wholly by British women, may well have appeared to French eyes in the early days of the last war as a rather dubious joke," writes G. M. M.; "it was the personality of its médecin-chef that brought about its acceptance as a serious, and indeed a notable, venture. Indomitable, even on occasion ruthless, Miss Ivens was quicker than most people to see and to seize opportunity. Her instinct was for the new and experimental, for risk rather than routine. In 1916 when gas gangrene raged through the hospitals after the battle of the Somme, she invited Professor Weinberg of the Institut Pasteur to Royaumont, where for some weeks he made clinical trial of his new sera that were to prove effective in the treatment of anaerobic infections. Again, in 1918 when Tuffier, that great French surgeon, swept through the army hospitals, urging against all accepted canons the primary suture of gunshot wounds, Miss Ivens was among the first to adopt the new technique.

"There was a touch of gallantry about 'Madame la Colonelle' that appealed to the French love of panache. I remember an inspection at short notice by Lardennois, one of the first surgeons in France at that time. There was in the hospital a soldier with a piece of shell in an almost inoperable position among the great vessels of the neck. When the great man arrived he found Miss Ivens in the theatre, imperturbably tackling this tricky job for his entertainment. It was characteristic of her to choose such a moment, and to carry through the operation with superb assurance and success.

"Miss Ivens' greatest opportunity came in 1918, when her advance hospital at Villers-Cotterets suddenly found itself in the front line as the Germans pushed south from the Aisne. Though officially ordered to retreat she put her services at the disposal of the medical director of the sector, who accepted gratefully her offer to remain; it so happened that this hospital was the only one functioning fully in the chaos of that time and place. With a picked team of doctors and nurses she carried on for another day and night, leaving only when she had seen the last of the men packed into the last ambulance, about half an hour before the Germans entered the town. And so the figure of Frances Ivens, handsome, urbane, incredibly alive, dominates the memories of the last war for those who served with her. Her insatiable energy and passion for efficiency may have worn us out, but she spared herself least of all; her intolerance of weakness and folly were not easy to bear, but she was a leader, and well we knew it."

For many years Miss Ivens found much happiness in her work. Later she found another happiness through marriage with a friend of many years' standing. At their home near Truro she made new contacts and enjoyed the comfort of a lovely garden. On the outbreak of this war she undertook the work of medical inspector for the Red Cross in the county—in her own words, a full-time job. She will long be remembered as one of the outstanding women in the medical profession.

WILLIAM ROME CAMMOCK

MB GLASG, FRCSE

Mr. W. R. Cammock, aural surgeon to the Oldham Royal Infirmary and to Rochdale Infirmary, collapsed while driving his car on Feb. 4 and died soon afterwards in Boundary Park General Hospital where he was also a member of the staff. Born in 1886, the only son of a Glasgow solicitor, he was educated at Hutchison's College and at the University of Glasgow, graduating MB in 1906. After holding house-appointments at Glasgow Royal Infirmary, where one of his chiefs was Sir William Macewen, and spending a short time in general practice he decided to specialise in aural surgery, and became resident aural officer at the Leeds General Infirmary. He continued his studies in Vienna and in 1914 settled in Oldham where he was soon appointed to the infirmary staff. Here he quickly developed a large and efficient ear, nose and throat department and gained a reputation as clinician and operator. He was indeed something of a pioneer in his specialty in this district of Lancashire; he worked with great zest and read widely, keeping himself abreast of modern technique.

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In recent years he had adopted the intrameatal approach to the mastoid with excellent results. He held that it was the surgeon's job to adapt himself to human needs. When he settled at Oldham, goitre was still common there and he addressed himself to its relief with exemplary zeal, becoming a real expert in the surgery of the thyroid.

Mr. Henry Poston, a colleague for many years, writes: Cammock died as he would have wished, working at full pressure and at the height of his power. Essentially a clinician, he possessed an infinite capacity for taking pains and for attending to detail. In his heavy clinics he would listen as carefully and sympathetically to the last patient as he did to the first. He was a careful and courageous operator, keeping his eye on the patient and ignoring the clock. For many years he struggled obstinately against chronic ill health. He might, perhaps, have taken things more easily, but the line of least resistance was not his choice. Cammock had the gift of being able to teach and inspire his house-surgeons. He was gentle but firm, knew what he wanted and saw that he got it. He never did any ill and the good he did cannot be interred with his bones.

MAYNARD HORNE

M B CAMB, MRCS

Maynard Horne, was a first-rate administrator of anæsthetics. He contributed little or nothing to the written doctrine of his specialty, but generations of students at St. George's Hospital benefited by watching his work and listening to his advice. For several years Horne was principal anæsthetist to Mayo Robson, after his migration from Leeds to London, and especially for abdominal operations his services were much sought by other surgeons also. He had put to good use the experience he gathered while serving in France with the RAMC in the last war. Horne's home life was a happy one. He married early, soon after leaving Cambridge, and his wife and daughters added to the charm of his hospitality in Nottingham Place. His recreations were mainly physical. Usually his holidays were spent in Scotland, where he shot and fished. Lawn tennis, however, was his main diversion and he remained a keen and effective player at an age when most men find it convenient to give up strenuous exercise. For years he organised and took part in annual matches between Queen's Club and St. George's. Of recent years he had undergone serious abdominal operations, and suffered from severe trigeminal neuralgia, happily relieved by injection. From these trials, although sometimes his life was almost despaired of, his indomitable spirit emerged triumphant. Then symptoms of heart-failure showed themselves and he died, after a short period of inactivity, on Feb. 7 at his son-in-law's country house near Rickmansworth. He was 74. J. B.

ALEXANDER DRUMMOND BONE

DSC, M B LOND; SURGEON LIEUTENANT RNVR

Surgeon Lieutenant Alexander Bone, who is reported missing presumed killed, was the son of Mr. and Mrs. Drummond Bone. He came of a family of sailors and men of letters, for he was the nephew of David Bone, commodore of the Anchor Line, Sir Muirhead Bone the artist, and James Bone, London editor of the *Manchester Guardian*. An accident to his spine which kept him in bed for over a year focused his interest on medicine, and on his recovery in 1933 he entered St. Thomas's Hospital medical school and qualified shortly before the outbreak of war. At the hospital he is remembered as "one of those non-aggressive, non-assertive people who went about their work and made a good job of it without exhibition or the clashing of cymbals." After holding a resident appointment there he joined the Navy at the beginning of 1940 and was posted to HMS *Dorsetshire*. He was serving with her when she sank the *Bismarck*, but on his return to England Bone made up his mind to have done with the big ships and applied for leave to join the destroyers. He was posted to HMS *Lively* and was on her when, while protecting a convoy to Malta, she sank the Italian battleship *Littorio*. The *Lively* herself was later sunk by dive bombing, but though she went down in a few minutes Bone was picked up by another ship, and it was for his bravery in this action he received the DSC. But later when HMS *Dulverton* was sunk Bone was not among the survivors.

JOHN RAMSAY

KT, CBE, M S MELB, F R A C S

Sir John Ramsay, who has died at the age of 72, was one of the founders of the Royal Australasian College of Surgeons and a past president of the Tasmania branch of the British Medical Association. Born in Scotland he was brought up at Melbourne where he qualified in 1894, taking his higher surgical qualification in 1902. For fourteen years he was superintendent of the Launceston General Hospital, continuing his association with the hospital as consulting surgeon and chairman of the board of management. He was also a member of the medical council of Tasmania. During the last war Ramsay acted as surgeon to the 12th Australian General Hospital and in 1924 he was awarded the CBE; his knighthood followed in 1939. He married Miss Ella Elizabeth Pegus Dudley of London and they had three sons and two daughters.

Births, Marriages and Deaths

BIRTHS

BROWN.—On Feb. 13, the wife of Surgeon-Lieutenant E. N. Brown, of Quex Road, N.W.6—a son.

CLARKE.—On Feb. 12, at Blundellsands the wife of Surgeon Lieut.-Commander C. Astley-Clarke, RNVR—a son

COCKBURN.—On Feb. 13, in London, the wife of Captain Hugh Cockburn, RAMC—a son.

FLOCKTON.—On Feb. 12, in Dublin, the wife of Captain Peter Flockton, RAMC—a daughter.

GLADSTONE.—On Feb. 15, in London the wife of Dr. Gerald Gladstone—a son.

HARDENBERG.—On Feb. 12, in London, to Dr. Janet Hardenberg (née Walker), the wife of Flight-Lieutenant H. E. W. Hardenberg, MRCS, RAFVR—a son.

HOWELL.—On Feb. 15, the wife of Dr. W. B. Howell, of Brenchley, Kent—a daughter.

LESTER.—On Feb. 14, at Kaduna, Nigeria, the wife of Dr. H. M. O. Lester, OBE—a son.

MCSHEEHY.—On Feb. 14, at Woking, the wife of Major H. O. P. McSheehy, RAMC—a son.

REEVES.—On Feb. 16, at Epsom, the wife of Dr. T. Lothrop Reeves, —a daughter.

ROBERTS.—On Feb. 19, at Edgware, to Dr. Mary Roberts (née Tate), the wife of Dr. John C. Roberts—a daughter.

THOMPSON.—On Feb. 12, at Esher, the wife of Captain J. R. O. Thompson, RAMC (missing at sea in Jan. 1944)—a daughter.

WATSON.—On Feb. 13, at Oxford, the wife of Major J. S. F. Watson RAMC—a son.

MARRIAGES

FURNELL—O'KELLY LYNCH.—On Jan. 13, at Langley Moor, Durham, Michael John Gerald Furnell, captain, RAMC, to Geraldine O'Kelly Lynch.

PINK—SHERRARD SMITH.—On Feb. 13, at Bath, Cyril V. Pink, MRCS, of Blackheath, to Marguerite Sherrard Smith.

DEATHS

CURTIS.—On Feb. 16, in London, Henry Jones Curtis, FRCS.

EYRE.—On Feb. 17, at Ivy Hatch, near Sevenoaks, John William Henry Eyre, MS, MB DURH., DPH.

FAWCETT.—On Feb. 18, in London, John Fawcett, MD LOND., FRCP, aged 77.

FERNIE.—On Feb. 15, at Wootton Bassett, Wilts, Andrew Fernie, LRCPE, of Axminster, Devon, aged 75.

GAVIN.—On Feb. 18, Alexander Cram Gavin, MB ABERD.

JENNEY.—On Feb. 17, George William Jenney, MB RUI, lieut.-colonel IMS (ret.), of Topsham, Devon.

LENEY.—On Feb. 15, Lydia Ann Leney, MD BRUX., of Upper Wimpole Street, W.1.

LUARD.—On Feb. 16, at Wickham Bishops, Hugh Bixby Luard, MB CAMB., major IMS, aged 81.

SILLEY.—On Feb. 16, at Ashby-de-la-Zouch, Herbert Henry Silley, MRCS, aged 52.

TOLPUTT.—On Feb. 18, at Kettering, Arnold George Tolputt, MRCS.

WATSON.—On Feb. 15, at Harrogate, Robert Nimmo Watson, MRCS, aged 67.

A liquid extract of belladonna leaf, now added to the British Pharmacopœia, can be dispensed when the ordinary liquid extract is prescribed. The Scarce Substances Order permitted the pharmacist to dispense a corresponding liquid extract, concentrated tincture or liquor in place of certain tinctures and spirits, to save alcohol. Liquid extract of belladonna, which is made from the root, was the substitute for the tincture, which is made from the leaf. The new extractum belladonnæ folii liquidum has been introduced to readjust the demand for leaf and root.

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Notes and News

OPHTHALMOLOGICAL RESEARCH AT OXFORD

SPEAKING at a luncheon given by the Lord Mayor of London at the Mansion House on Feb. 22 to representatives of industry and public life, Sir David Ross, vice-chancellor of the University of Oxford, made an appeal on behalf of the Oxford Ophthalmological Research Endowment Committee (see *Lancet*, 1943, ii, 328). He pointed out that though nearly £4 million was spent each year in this country on the maintenance and care of the blind, only a small fraction went to planned prevention of blindness. Oxford had chosen the task not of making tolerable the lot of the blind but of preventing blindness and defects of sight. The number of our blind was gradually increasing—in March 1942 there were 73,306 or nearly 1000 more than in 1941. In 1927, 12·9% of the children inspected in London elementary schools suffered from defects of sight and 9·2% in country schools; in 1938 these figures had risen to 20% and 13·2%. To meet this evil we must improve our ophthalmic services, educate the public and increase facilities for research. And research was the basis of all. Coöperation with the ophthalmologist would, Sir David suggested, be to the advantage of employer and worker alike. At one factory lately, their reader, Miss Mann, had discovered a wastage of 12% among trained workers unable to continue their job because of eyestrain. Sight-testing before training, lighting of the workshop and the provision of safety devices were all subjects on which the ophthalmologist could advise. Other bodies who stood to gain by advancement of research were the approved societies and the insurance companies. Sir David appealed with confidence to his listeners for their help in establishing at Oxford "a well-equipped institute . . . to put our country in the very forefront of research in this great and beneficent field."

Donations should be sent to the hon. treasurer of the fund, Old Clarendon Buildings, Oxford.

Royal College of Surgeons of England

At 4 PM on Mondays, Wednesdays and Fridays during March, beginning on the 6th, Prof. A. J. E. Cave will give a series of Arnott demonstrations and museum lecture-demonstrations.

MOH School Medical Group

At a meeting of the group to be held at Tavistock House, London, W.C.1, on Friday, March 3, at 5.30 PM, Dr. R. H. H. Jolly, president of the Society of MOHs, will open a discussion on the Education Bill.

John Levis Memorial Fund

As a memorial to the late John Levis it is proposed to build a double operating theatre unit adjoining the Royal United Hospital, Bath. Mr. Levis, who was a surgeon to the hospital, was operating there a few hours before his sudden death at the age of 55 on Nov. 5 of last year. The cost of the unit has been estimated at £25,000 and an appeal has been launched to raise this sum during 1944. Donations to the hon. treasurer of the fund, Old Bank, High Street, Bath.

Royal Society of Medicine

At a meeting of the section of odontology at 4.30 PM on Monday, Feb. 28, Squadron-Leader Warren Harvey will read a paper on dentistry in relation to aviation, and Mr. E. B. Manley, BDS, will open the discussiom which is to follow. At the section of history of medicine, on March 1, at 2.30 PM, Prof. S. Lyle Cummins will speak on some English phthisiologists. On the same day, at 4.30 PM, the section of surgery will meet at the London Hospital, E.1, and cases will be shown. At the section of neurology on March 2, at 4.30 PM, Prof. W. E. Le Gros Clark, Dr. Gordon Holmes, FRS, Major J. W. Aldren Turner and Dr. J. G. Greenfield will open a discussion on the visual pathways. On March 3, at 10.30 AM, at the section of otology, Mr. I. Simson Hall will read a paper on the surgical treatment of otosclerosis. Mr. T. E. Cawthorne and Major E. P. Fowler, USAMC, will also speak. On the same day, at 2.30 PM, at the section of anæsthetics, Brigadier Ashley Daly, Lieut-Colonel R. M. Tovell, USAMC, and Major R. A. Binning will describe their impressions of anæsthesia in the field. At the same hour, at the section of laryngology, there will be a discussion on the treatment of carcinoma of the œsophagus. The opening speakers will be Mr. Hermon Taylor, Dr. W. M. Levitt, Mr. G. H. Steele and Dr. Manuel Lederman.

Medical Honours

The following honours have been awarded to RAMC officers:

KBE.—Major-General E. M. Cowell, CB, CBE, DSO, FRCS, late RAMC.

DSO.—Lieut.-Colonel Archibald Crerar, MC, MB ABERD.

MC.—Major D. L. Lewis, FRCS; Captain J. J. Sumner, MD DURH.

Lord Chancellor's Visitor

Dr. E. O. LEWIS, a commissioner of the Board of Control, has been appointed one of the Lord Chancellor's medical visitors in succession to Dr. Arthur Rotherham who has retired.

Dr. Lewis graduated BSc Wales from University College, Aberystwyth, in 1903. He obtained his Cambridge MA in 1908 and after further postgraduate study at Jena took his DSc Lond. in 1910. He held a lectureship in psychology at Cambridge and in educational psychology under the London County Council before taking his MRCS from University College Hospital in 1921. As a medical inspector of the Board of Control he organised a survey of mental defect over a period of 2½ years in six areas which establishes a mean figure of 8·57 defective people per 1000 population—a proportion far higher than that previously accepted. His work suggested that mental deficiency, much physical deficiency, chronic pauperism and recidivism are all parts of a single focal problem. He became a commissioner in 1931. Later his report on the relief of the casual poor led to reforms in the administration of casual wards. He has lately contributed the section on crime and mental deficiency to the *English Studies in Criminal Science* of the Cambridge University law department.

Rubber Gloves

The basic ration of rubber gloves for doctors in private or consulting practice is again to be 6 pairs a year. Applications for certificates should be made to the Central Medical War Committee, BMA House, Tavistock Square, W.C.1, marking the envelope "gloves" and enclosing a stamped addressed envelope for reply. Requests for supplementary rations should be made, as before, to the Regional Officer of the Ministry of Health.

Sir ERNEST GRAHAM-LITTLE, MP for London University, has been re-elected chairman of the Committee of University Members of the House of Commons.

Surgeon Captain H. M. WHELAN, MRCS, has been promoted to the rank of surgeon rear-admiral.

Dr. T. F. STRANG has been nominated a member of the executive council of the Island of Saint Helena.

'WELLCOME' Brand sterilised sulphanilamide products, hitherto put up in 15 g. sealed bottles, are now issued in 5 g. double envelopes, which are germ-proof and are supplied in sets of 6, 25 and 100. Products available are sulphanilamide, and sulphanilamide compound (containing 5% of zinc oxide, for use on surface lesions and open wounds only).

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export.

Infectious Disease in England and Wales

WEEK ENDED FEB. 12

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 1870; whooping-cough, 2009; diphtheria, 687; paratyphoid, 5; typhoid, 6; measles (excluding rubella), 1245; pneumonia (primary or influenzal), 909; puerperal pyrexia, 171; cerebrospinal fever, 62; poliomyelitis, 6; polio-encephalitis, 0; encephalitis lethargica, 2; dysentery, 220; ophthalmia neonatorum, 81. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Feb. 9 was 1796. During the previous week the following cases were admitted: scarlet fever, 115; diphtheria, 35; measles, 36; whooping-cough, 48.

Deaths.—In 126 great towns there were no deaths from enteric fever, 1 (0) from measles, 1 (0) from scarlet fever, 11 (2) from whooping-cough, 13 (0) from diphtheria, 50 (14) from diarrhœa and enteritis under two years, and 51 (6) from influenza. The figures in parentheses are those for London itself.

Birmingham reported 3 fatal cases of whooping-cough. Liverpool had 5 deaths from influenza.

The number of stillbirths notified during the week was 224 (corresponding to a rate of 33 per thousand total births), including 24 in London.

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PENETRATING WOUNDS OF THE CHEST

REVIEW OF 291 CASES IN THE MIDDLE EAST

W. F. NICHOLSON
M CHIR CAMB, F R C S
MAJOR RAMC

J. G. SCADDING
M D LOND, F R C P
LIEUT.-COLONEL RAMC

Now that the African campaign is over, it seems opportune to review the experience of a chest team in Egypt and Tripolitania from April, 1941, to May, 1943. It is proposed in this paper to discuss the methods of treatment used and the results obtained in 291 cases of penetrating wounds of the chest. Non-penetrating wounds, crush and blast injuries are not included.

The cases fall into three distinct groups, treated under different conditions. The first consists of 131 cases treated at base hospitals between November, 1941, and March, 1943, and arriving under our care usually 7–14 or even more days after wounding; the second of 33 cases received in a general hospital which was working as a CCS during July and August, 1942, generally within 48 hours of wounding; and the third of 127 cases, men wounded in the battle of Tunisia and treated at an advanced general hospital within 2 or 3 days of wounding. One of us (J. G. S.) was with the team until October, 1942, only. The results of treatment in each of these groups are shown in table I.

TABLE I—SUMMARY OF RESULTS

Group	Period	Days between wounding and arrival	Cases	Results of treatment				
				To conv. dep. or duty	Transferred— in good condition	Transferred— in poor condition	Invalided	Died
1	Nov., 1941, to March, 1943 ..	7–21	131	76	32	4	18	5*
2	July–Aug., 1942 ..	1–2	33	?	30	1	?	4*
3	March–May, 1943	2–3	127	46	64	0	7	10
	Total ..	..	291	122	126	5	25	19*

Conv. dep. = convalescent depot.
* These figures include deaths known to have occurred after transfer to other hospitals.

LOCATION OF SPECIAL SURGICAL CHEST TEAMS

This varied experience has given us reasonable grounds on which to form an opinion about the most suitable place for a surgical chest team in mobile warfare. Conditions in this sort of warfare are such that the necessary general policy in the Middle East has been to reduce intervention in forward areas in cases of chest-wounds to essentials; this means closing sucking wounds and aspirating hæmothoraces large enough to be causing embarrassment. After this, patients are as fit for evacuation as they are likely to be for many days; those whose hæmothoraces become infected are less fit to be moved after the first few days. We found that we were able to do the most useful work at our third location, and therefore consider that a chest team is best situated at a forward base hospital, to which patients can be evacuated as soon as possible and held until fit to move farther back. Patients from a long battle front can be made to pass through a unit so placed, whereas no segregation of special types of case to any one CCS is possible in this type of warfare. Moreover, better radiological, theatre and nursing facilities at a base hospital help to outweigh any possible advantage of taking the specialist surgeon forward to the patient.

SURGERY OF CHEST-WOUNDS IN FORWARD AREAS

Usually, surgery in forward areas has been confined to closure of sucking wounds. In our early cases infection in the chest-wall was often seen when sucking wounds had been tightly sutured. When the deeper layers were sutured firmly and the skin loosely stitched over a soft paraffin pack there was a great fall in the incidence of cellulitis of the chest-wall. This form of closure of sucking wounds is the best solution of the problem of sealing an open pneumothorax while at the same time providing drainage of the chest-wall wound. There has been no difficulty in delayed primary suture of wounds which have remained clean; on the other hand, healing is often greatly delayed in infected wounds which break down after having been tightly sutured. Small entrance or exit wounds do not need excision unless complicated by comminuted fractures of ribs or bleeding from intercostal vessels. Compound fractures of the ribs or scapula require excision of the wound-edges and removal of bone-splinters and trimming of bone-ends; in-driven fragments of bone in the lungs are in our experience a far more potent cause of persistent hæmoptysis in the earlier days, and intrapulmonary suppuration later, than metallic foreign bodies. Visceral surgery in forward areas has been of the most limited character. Very occasionally, lacerated lung immediately visible in the wound has been sutured. No formal thoracotomy has been done at this early stage, but in a few cases the wound has been enlarged to allow removal of blood and debris from the pleura. No attempt has been made to remove pulmonary foreign bodies, with the exception of bone-fragments in the periphery of the lung, at this stage.

MISSILES

The incidence of wounds due to various missiles is shown in table II. As is to be expected, shell, bomb and mine fragments are retained far more frequently than bullets. A bullet-wound may sometimes cause remarkably little upset, even when it involves the lungs and mediastinum. One patient was shot through and through from side to side, the bullet traversing the right upper arm, entering the chest in the fifth intercostal space in the right midaxillary line, leaving it in the fifth intercostal space in the left posterior axillary line, and finally traversing the left upper arm. It must have passed through both lungs, but there was no hæmoptysis and very little dyspnœa; the patient was up on the 13th day and discharged to convalescence in 3 weeks.

A high proportion of the thoraco-abdominal wounds were due to bullets, probably because shell, bomb and mine wounds involving both cavities were more serious and fewer of the victims of them survived to reach hospital. Excluding the thoraco-abdominal wounds, an eighth of the empyema cases followed bullet-wounds, which caused a quarter of the total casualties. The incidence of empyema in patients wounded by bullets was a little over a third of that in those wounded by fragments.

TABLE II—MISSILES RESPONSIBLE FOR PENETRATING WOUNDS

Missile, when known	With retained foreign body	Without retained foreign body	Total
Stab	0	4	4
Bullet	24	51	75
Shell	131	15	146
Mine	10	2	12
Bomb (mostly mortar)	51	2	53

CHEMOTHERAPY

Sulphanilamide is given by mouth as a routine. During evacuation it is impossible to ensure that four-hourly doses are given; therefore now along the line of evacuation a dose of 2·5 g. is given every 12 hours, and all patients in a convoy receive this dose at the same time. Since the adoption of this method there has been a great improvement in the adequacy of chemotherapy before admission to hospital. This is reflected in a great diminution of the hæmolytic streptococcal infections in Tunisian cases, as compared with those treated previously in Egypt. Of 20 cases of empyema in Egypt in 1941–42 *Strep. hæmolyticus* was present in 16, and *Staph. aureus* and Friedlander's bacillus in 2 each; in 32 cases from Tunisia in 1943

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Strep. hæmolyticus was present in 7 only, while *Staph. aureus* was responsible for 18 (table III). The pre-

TABLE III—BACTERIOLOGICAL FINDINGS IN HÆMOTHORAX CASES IN THE TUNISIAN CAMPAIGN

Organisms cultured in (*a*) 32 infected cases which formed an empyema; (*b*) 24 cases which resolved without the appearance of pus.

	(*a*) With empy.	(*b*) Without empy.
Staph. albus	2	17
Staph. aureus	18	8
Strep. hæmolyticus	7	2
Non-hæmolytic streptococci	4	1
Pneumococcus	3	0
Friedlander's bacillus	5	1
Pfeiffer's bacillus	0	1
B. fusiformis	1	0
B. coli	5	0
Paracolon bacilli	0	3
B. morgani	1	0
B. fæcalis alk.	1	4
B. subtilis	9	2
B. proteus	1	0
Diphtheroids	9	3
Clostridia	2	0

empy. = empyema

valence of staphylococcal infections suggests that sulphathiazole, as advocated by Tudor Edwards (1943), might reduce still further the incidence of infection; but the insolubility of the acetyl derivative of this drug increases the risk of renal complications with it, and necessitates great care in the maintenance of a high water intake during its administration. This is a strong argument against its wholesale use as a prophylactic under battle conditions, even if it were available. Sulphadiazine, which is at present out of the question as a routine prophylactic drug on account of its costliness and scarcity, would probably be most efficacious, on account of its additional action against Friedlander's bacillus. Sulphapyridine, which we have found is sometimes given in cases of chest-wounds with the notion that it may prevent pneumonia, should be avoided. It makes many patients feel extremely ill, and there is no evidence that pneumococcal pneumonia is more frequent after chest-wounds than other wounds. We have had no opportunity of using penicillin, but its efficacy when introduced directly into the pleura in cases of hæmothorax, both as a prophylactic and as a therapeutic agent against infection, should certainly be investigated.

HÆMOTHORAX

Table IV shows that in over half the cases a hæmothorax was present. At first we treated hæmothorax on the lines suggested by one of us (Scadding 1941), using air-replacement in cases in which a large aspiration

TABLE IV—PATHOLOGICAL ANALYSIS OF CHEST-WOUNDS

Pleural cavity	
Pneumothorax only	11
Hydropneumothorax	2
Tension pneumothorax	1
Chylothorax	1
Hæmothorax	187
Uninfected—125	
Small, not aspirated	8
Aspirated	111
Clotted, confirmed at operation	6
Infected—62	
Drainage by rib-resection	56
Clotted	6
Lung	
Contusion, with or without atelectasis, but no appreciable hæmothorax	65
Acute lung abscess	3
Heart	
Traumatic pericarditis—	
Non-suppurative	4
Suppurative	2
Mediastinum	
Wounds with retained f.b. but without hæmothorax	5
Thoraco-abdominal wounds	
Uncomplicated	4
Liver wounded	8
Ruptured spleen	1
Renal wound	1
Diaphragmatic hernia	2
Paralysis of diaphragm	1
Subphrenic abscess	5
Empyema	8
Cerebral complications	
Immediate	3
Late	1
Cause of death	
Empyema	8
Abdominal lesions	4
Secondary hæmorrhage	2
Lung abscess with retained metal f.b.	1
Acute suppurative pericarditis	1
Subphrenic abscess	1
Cerebral abscess	2

was required during the first week. But after a time it became clear that simpler methods were quite adequate. There is no doubt that, as Tudor Edwards has stressed, the sooner aspiration is performed the less the chance of infection, particularly when no foreign body, or only a small one, is retained. The danger of hæmorrhage recurring as a result of a simple aspiration in the first few days has been exaggerated; unnecessary fear of this event had sometimes led to insufficient aspiration or inefficient attempts at air-replacement before patients with large hæmothoraces came under our care. In the whole of our series there were only 2 cases of secondary hæmorrhage—one from an intercostal vessel on the 12th day, and the other from the lung on the 18th day; both were fatal. In the second case there was a metallic foreign body in the centre of the lung, which was riddled with tubercles. Bleeding from the lungs is unlikely to recur if hæmoptysis does not persist; bleeding from the intercostal vessels will not be prevented by air-replacement. On the other hand, air-replacement by causing apical collapse and delaying the expansion of the lungs leaves the whole pleural cavity open to infection, with the result that if an empyema forms it is total; whereas if the hæmothorax is aspirated early without air-replacement the upper lobe will probably expand and become adherent, and if infection occurs a small basal empyema only is probable.

We tried several policies with hæmothorax. After giving up routine complete air-replacements, we either did repeated simple aspirations, stopping each time as soon as the patient complained of tightness in the chest, or as complete aspiration as possible at one sitting, introducing air only to prevent pain or discomfort arising from too low a pleural pressure. We found that the patient's sensations, if he had been warned to say

TABLE V—CELL-COUNTS IN 5 CASES OF STERILE HÆMOTHORAX

Day after wounding	Red cells per c.mm.	Total nucleated cells per c.mm.	Differential count of nucleated cells (%)							
			Neutrophil segmented	Eosinophil	Lymphocytes: Small	Lymphocytes: Medium	Lymphocytes: Large	Macrophages: Phagocytic	Macrophages: Non-phagocytic	Basket cells
7	3,560,000	5800	53·6	..	3·2	12·8	..	18·4	6·4	5·6
8	1,980,000	15,600	81·6	..	0·4	4·0	..	8·8	3·2	2·0
22	375,000	3600	1·5	..	16·5	62·0	1·0	8·5	1·0	9·0
22	352,000	3200	3·8	..	23·8	47·5	0·5	19·6	0·5	3·8
22	116,000	300	24·0	0·5	32·0	23·0	1·5	14·0	..	4·5

when his chest felt tight, was a perfectly adequate guide to a safe level of pleural pressure, so that manometry was unnecessary. If after the removal of, say, 500 c.cm. of blood the patient feels that his chest is "tight," 50 to 100 c.cm. of air is introduced, relieving the discomfort and permitting the aspiration to be continued. With a large hæmothorax under pressure no air-replacement is required, for there may still be a high intrapleural pressure even after as much as 1500 c.cm. of blood has been slowly removed. A minor advantage of introducing a little air is that a fluid level is produced, which helps in radiological location of a residual pocket. In occasional special cases complete air-replacements have been done to facilitate radiography.

This policy of aspiration with minimal air-replacement, or none at all, was found the best in the conditions under which we were generally working; receiving patients not less than 48 hours and often very much longer after wounding. In some of the cases in group 2, received less than 48 hours from wounding, we performed complete air-replacements, and even deliberately introduced in a few a greater volume of air than the blood removed, in view of the theoretical advantages of collapse of the lung by pneumothorax at this early stage. The immediate results were gratifying; but we have no means of comparing the results with those in which bleeding was stopped by the pressure of the hæmothorax itself, the latter not being aspirated until this result had been assured. It seems unlikely however that treatment by very early air-replacement and establishment of pneumothorax will ever prove practicable as a routine under battle conditions. Under such conditions it is unnecessary to delay evacuation in order to aspirate a small hæmothorax which can be dealt with a few hours later at a base hospital; but large hæmothoraces

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causing severe respiratory distress must of course be aspirated without delay, sufficiently to bring the heart back into, or almost into, normal position. Most of the hæmothoraces in this series, even some very large ones, had had no aspiration before reaching the chest unit.

Cytology of sterile hæmothorax.—In the earlier part of our work we were at the same hospital as Major (now Lieut-Colonel) R. Bodley Scott, who carried out cell-counts on the fluid from 5 cases of sterile hæmothorax. These counts are summarised in table v. It will be seen that the erythrocyte-count falls to only a few hundred thousand per c.mm. by the end of the third week. The number of neutrophils diminishes, and the lymphocytes correspondingly increase as the hæmothorax becomes older, so that by the end of the third week lymphocytes predominate in the nucleated-cell count. The macrophages in the earlier specimens contained ingested red cells but no pigment; in the later specimens many of them were heavily laden with pigment.

INFECTED HÆMOTHORAX

In a third of the cases the hæmothorax was infected and eventually required drainage. This high proportion may correct prevalent notions about lack of sepsis in the desert (Littlejohn 1942). It is most probably attributable to the high proportion of wounds caused by jagged metallic fragments, as opposed to bullets; in this respect conditions differ from those of the South African war.

When infection was present there was a great variation in the time at which pus appeared and in the constitutional disturbance. Organisms were most often found at the first aspiration, but in a few cases not until later. The appearance of organisms in smears and on culture did not always indicate that suppuration was inevitable; several cases in which organisms have thus been found have resolved with aspiration and chemotherapy (see table III, which demonstrates this even after allowance has been made for the organisms which are probably mere contaminants). The patient's general condition and the number of polymorphs in the aspirated fluid are often of more prognostic value than the bacteriological report.

The earliest day on which drainage was performed was the fifth, when an intercostal drain was necessary in an infected hæmothorax, already too thick to aspirate. The latest drainage was after two months with a *B. coli* infection; in this case repeated aspirations constantly yielded a positive culture but pus did not form till the fifth week, and the patient remained afebrile throughout. Aspiration is repeated until definite pus appears; when this is too thick for easy aspiration an intercostal tube is inserted with water-sealed drainage. Sometimes, in very toxic patients, the intercostal drain has been inserted earlier, at a stage when it is still possible to aspirate; this has considerably improved the general condition, for the pleural cavity remains drained continuously, instead of being emptied every other day. Moreover, in a patient with other wounds (compound fracture of the humerus is a not uncommon accompaniment) the discomfort of frequent aspirations is avoided; with a limited staff and a flood of casualties it is very difficult to aspirate septic cases sufficiently often. The drainage has remained airtight until rib-resection was necessary.

Rib-resection.—Stress has been laid on the danger of early rib-resection in a pyothorax; and there is no arbitrary time limit after which open drainage is quite safe. Even the test of waiting till the pus withdrawn is ⅞ solid on standing is not a sure guide in these cases, for often the lung and mediastinum are still surprisingly free from adhesions. The pleural reaction to infection is much more variable in a hæmothorax than in a post-pneumonic empyema, and to assume that adhesions will be strong because the pus is thick is unwarrantable. The only safe way is for the anæsthetist to be prepared in advance to control the lung if few adhesions are found. This is not to advocate early rib-resection, but to point out that, even when by the ordinary rules drainage should be safe, inadequate adhesions may still be present.

Although, for these reasons also, a period of water-sealed airtight drainage is required in all cases, suction has been used in only a few, being reserved for those in which the empyema was total and the lung was not expanding after a short period of simple water-sealed drainage. The early use of suction may cause unequal expansion of the lung, which by producing loculi in the empyema cavity prevents efficient drainage. Lung expansion in any case may be very irregular owing to the destruction of lung tissue; hence there is an additional danger in using suction too early in these cases. If this fact is appreciated, however, it is quite proper to make careful use of suction in the later stages to aid expansion of the remaining lung and so lower the incidence of chronic empyema.

Pleural foreign bodies.—Where a pleural foreign body is present it should be removed at this stage if possible. This sometimes requires more manipulation than simple rib-resection allows. But on no account should adhesions be broken; the operation is for drainage, not primarily for the removal of the foreign body, which must be left if not readily accessible. When a foreign body has to be sought in the pleural cavity at an operation for drainage of an empyema it is generally safer to use general anæsthesia, with positive pressure if when the chest is opened the adhesions are found to be scanty. In the whole series there were only 14 pleural foreign bodies; in 2 instances they were removed early because they were very large and causing pain; in 10 they were removed when the associated empyema or clotted hæmothorax was drained; twice they were left to be removed later.

RESULTS OF TREATMENT OF HÆMOTHORAX

Uninfected.—Complete aspiration, repeated when necessary, with breathing exercises, results in early return to duty. At first any man who had a hæmothorax was downgraded for three months, but in the last year a few patients have returned to full duty after a short convalescence. But this remains exceptional; the majority still complain of pain from pleural adhesions and dyspnœa on exertion for three to six months.

Infected.—In 52 cases of infected hæmothorax, uncomplicated by pulmonary or subphrenic suppuration, only 12 of the resulting empyemata are known to be healed; 29 were still under treatment when last seen, but many of these may now be healed. It has so often been necessary to evacuate patients before treatment was completed that it is impossible to give figures for the final results. Only one thoracoplasty was performed. Deaths, directly due to the empyema, numbered 10.

CLOTTED HÆMOTHORAX

In this series 6% of hæmothoraces were clotted; this is a rare condition. Why blood in the pleural cavity does not clot is not clear, but mechanical defibrination by respiratory and cardiac movements probably plays a part. Certainly it is common for fibrin to separate out from the blood and to sink down to the costophrenic sulcus. Herein lies a common source of difficulty in aspirating a hæmothorax. The beginner goes too low and his needle in the sulcus meets fibrin which keeps blocking it, whereas a space higher the needle will be above the fibrinous sludge and a smooth aspiration will follow. Sometimes the fibrin forms a clot, which differs from a blood-clot in the scarcity of the cells in the fibrin mesh. In appearance it is like rough wash-leather. In other cases the blood clots massively in the pleural cavity. Much tissue damage would favour clotting and this is probably an important factor. Infection is not an important factor. Of 12 clotted hæmothoraces for which operation was performed, 6 were infected and 6 uninfected, though it is significant that a small foreign body was present in the clot in 3 of the uninfected cases. Figures derived from operation cases give an unduly high incidence of infection in clotted hæmothorax, because it has been the rule to leave a small basal hæmothorax which could not be aspirated if there was no sign of infection; so that the presence of several probable small uninfected clots has never been confirmed by operation; whereas, if infection had been present, operation would have been performed and revealed the clot. Delay in aspiration may favour clotting, but evidence on this point is inconclusive. The first patient who required a thoracotomy for removal of a massive uninfected clotted hæmothorax was a man who had no aspiration till a month after he was wounded. On the

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other hand, a large clot was found at autopsy in a man who died of pericarditis eight days after he was wounded, his hæmothorax being infected and a large shell fragment retained in the middle of an organising clot. Table VI shows that one of three factors is always present—delay in aspiration, infection, or intrapleural foreign body.

TABLE VI—CAUSATIVE FACTORS IN CLOTTED HÆMOTHORAX: DELAY IN ASPIRATION, INFECTION, OR INTRAPLEURAL FOREIGN BODY

Week after injury when opn. performed	Day after injury when first aspirated	Large (L) or small (S) hæmothorax	Foreign body in clot	Infection
8	21	S	Bone	*Staph. aureus*
4	3	L	Small shell fragment	?
4	1	S	,,	None
3	3	S	,,	None
2	5	L	None	Friedlander's bacillus
2	5*	L	Large shell fragment	None
4	13	L	None	*Strep. hæmolyticus*
1	3	S	Small shell fragment	*B. proteus*
2	4*	L	None	Friedlander's bacillus
9	31	L	,,	None
7	11	L	,,	*Staph. aureus* and *B. fæcalis alk.*
4	7	L	,,	*B. coli* and *Staph. aureus*

* Dry tap.

When repeated aspirations have failed to empty the pleural cavity of blood, at each attempt only a few c.cm. being withdrawn, the possibility of a clotted hæmothorax should be considered. If large, the sooner that clot is removed the better, and for this purpose a formal posterior thoracotomy along the sixth space, with resection of an inch of the sixth rib at the angle, has been most satisfactory. Through this incision all clot can be removed, and small foreign bodies are not overlooked. Provided that an independent wound is made for the drainage-tube, usually with resection of an inch of rib, the wound heals by first intention. The pleural cavity has never been closed without drainage, even when the clot is uninfected; to do so would doubtless be successful in a few cases, but the risk of chronic empyema makes it dangerous.

PULMONARY CONTUSION

There were 65 cases of pulmonary contusion without gross hæmothorax in the series. The degree of local bruising of the lung by the missile varied very greatly. With extensive pulmonary contusion the patient may be extremely ill with persistent hæmoptysis, dyspnœa and cyanosis. The physical signs consist of dullness, often board-like, on the affected side, usually with absent breath-sounds, but without displacement of the heart or mediastinum. Radiographic signs consist of areas of opacity, not segmental or lobar in distribution, sometimes very extensive, involving almost the whole lung. The condition is sometimes complicated by atelectasis, which can be recognised by the usual signs. The symptoms at the onset often call for oxygen therapy, which affords some relief to the cyanosis; the hæmothorax patient, on the other hand, rarely needs oxygen, since his dyspnœa is relieved by aspiration. The severity of the symptoms in these cases of contusion is sometimes much aggravated by the accompanying atelectasis. The contused lung is liable to infection, which delays recovery, the condition passing over into a pneumonia. Nevertheless, most of these patients recover. In 3 instances in our series, abscess formation followed a pulmonary contusion. One was due to a shell fragment, the second to rib-splinters driven into the lung, and the third followed aspiration of blood from the contused left upper lobe into the right lower lobe where a putrid abscess formed.

PNEUMONIA

The pneumonia that follows infection of a contused area of the lung has been mentioned above. It is impossible to give figures of its incidence, since the condition merges insensibly into the uncomplicated contusion. There was however an interesting group of cases in which a pneumonia, usually lobar, developed in the unwounded lung, sometimes after the patient was well on the way to recovery. There were 10 of these altogether, of which 9 recovered.

Atelectasis of a lower lobe alone was observed in 14 cases. It was recognised by the usual clinical and radiographic signs. In 7 of these the diaphragm had been injured or irritated by a foreign body; in most of the rest small foreign bodies, sometimes multiple, were present in the affected lobe. All these collapsed lobes re-expanded with simple breathing exercises.

CEREBRAL COMPLICATIONS

In 4 cases cerebral complications were observed, in 3 immediately after wounding and in 1 on the 22nd day. The 3 which appeared immediately after wounding were thought to be due to air-embolism, though there were certain difficulties in this view. In one of these a right-sided hemiplegia and aphasia developed after a wound of the left side of the chest which produced an enormous hæmothorax; this patient recovered with severe residual hemiplegia and aphasia. In the second there was a right-sided hemianopia after a through-and-through bullet wound of the left side of the chest, also producing a very large hæmothorax. The third patient developed diplopia; he died from secondary hæmorrhage. In the fourth case a hemiplegia developed suddenly on the 22nd day, presumably due to embolism by an infected thrombus from the lung, for a cerebral abscess formed and the patient died.

FOREIGN BODIES

There is very little information about the ultimate fate of pulmonary foreign bodies. Most surgeons advocate that large foreign bodies (2 × 1 cm.) should be removed; others that they should be left till they cause symptoms; still others that all larger than a pea require removal. There is no doubt that the lung tolerates metallic foreign bodies very well; this is not the case with organic substances, such as bone-splinters and clothing. Radiological evidence of reaction around metallic foreign bodies is very rare; and this lack of reaction has been confirmed at operation.

When a foreign body is to be removed the surgeon must always ask himself which is the more dangerous—the foreign body or the operation for its removal. In the case of the lung this is no idle question. The easiest to remove are undoubtedly those in the periphery of the lung, from which they are best removed in two stages, as when dealing with a lung abscess. But these are the foreign bodies that least often cause trouble; and if abscess or hæmoptysis arises later the condition can be treated by an operation no more severe than that required to remove the inoffensive foreign body. Thus a conservative attitude leads to the avoidance of many unnecessary operations, with their resultant loss of duty time. Central foreign bodies, or those near the mediastinum, are more dangerous. If they are left until complications arise the operation for their removal is likely to be hazardous; whereas if they are removed early in one stage there is but a slight chance of empyema developing. Fortunately so many of these cases are associated with a hæmothorax that, by the time the foreign body is removed, adhesions are usually present and there is rarely danger of a total empyema. Moreover in most cases the foreign bodies are sterile. But though the risk of infecting the pleural cavity is slight, it must always remain a possible complication, which must be avoided if possible; this can be done by adopting the two-stage operation for the peripheral foreign bodies, for which this technique is satisfactory.

Mediastinal foreign bodies, particularly when close to the œsophagus or great vessels, call for removal if large—1 × 2 cm. or more. Here removal is easiest before adhesions become dense; moreover the risks of a mediastinal abscess, or of ulceration into the œsophagus or great vessels, warrant early surgical intervention. Such cases in this series include foreign bodies next to the œsophagus, one pressing on the trachea, some next to the great vessels in the superior mediastinum and one in the wall of the left ventricle. In general, therefore, large mediastinal foreign bodies have always been removed; large pulmonary foreign bodies have also been

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removed but the smaller ones have been left and the men returned to duty (see table VII).

TABLE VII—METALLIC FOREIGN BODIES REMOVED

Intrapleural (14)	
Removed at CCS stage (very large)	2
Removed at first rib-resection for empyema	10
Removed later	2
*Intrapulmonary** (7)	
Associated with lung abscess, in left lower lobe; healed rapidly	1
Large peripheral; removed in one stage	1
Large peripheral; removed in two stages	1
Large, near mediastinal surface of lung†	3
Large, in phrenic surface of left lower lobe	1
Mediastinal (7)	
Paracesophageal, removed without infection	4
Para-aortic, causing reflex vomiting associated with a small abscess	1
In a thoracic vertebral body	1
In wall of left ventricle, causing fainting attacks and cardiac arrhythmia	1

* An empyema developed in only one case, and here the associated hæmothorax was already infected at the time of operation. This was a foreign body pressing on the trachea which had to be removed early.

† Two of these were near the hilum; the third overlapped the trachea and caused paroxysmal cough.

A preliminary follow-up of 15 men with retained foreign bodies, wounded over a year previously, showed that 11 were at duty and 3 had been invalided. One patient had had hæmoptysis for which he was admitted to another hospital but further details are lacking; this patient had the only large foreign body in the series; he was one of the early cases and under the conditions then prevailing major thoracotomy as required (the foreign body was on the mediastinal aspect of the right lower lobe) was hazardous and not advised. A larger follow-up is still required.

THORACO-ABDOMINAL WOUNDS

There were 25 of these; only 5 (with 3 deaths) were seen within 24 hours of the injury. The other 20 represent survivors past the CCS stage. There was one death in this group, due to a subphrenic abscess, with bilateral empyemata and a suppurative arthritis of the knee. The early mortality in these cases is high and the late morbidity heavy. A subphrenic abscess due to an infected hæmatoma often produces no radiographic evidence. A gas bubble under the diaphragm was not present in any of these cases; seeing that the abscess is not necessarily due to perforation of the bowel or to gas-forming organisms this is not surprising. Therefore, if X-ray examination is inconclusive, but clinical signs suggest an abscess, operation should be advised. The track of the wound will usually suggest the appropriate subphrenic space to be drained.

In the early stage there may be great difficulty in deciding whether the abdomen is involved or not. Abdominal pain, tenderness and rigidity may be produced by diaphragmatic irritation. Radiograms taken of an extremely ill patient, and possibly in the presence of a hæmothorax, may leave doubt whether a foreign body is above or below the diaphragm. We have seen many cases of this sort where the abdomen has been opened and nothing abnormal found; and, on the other hand, a few where delay in laparotomy was unfortunate. Though thoracic surgeons have urged that a thoracic approach should be used in such cases, and for them such an approach may in some cases be best, we consider that for the general surgeon in a forward area confronted with a problem of this sort laparotomy must still remain the general rule. Most surgeons are happier in the abdomen than in the chest, and most chest-wounds do not require primary surgery; so that generally there will be least risk of harm in doubtful cases if the abdomen rather than the chest is opened.

GENERAL MEASURES IN AFTERCARE

The importance of general measures in aftercare cannot be over-emphasised. A high protein diet is required to replace the sometimes enormous loss of protein in purulent discharges. The vitamin-C requirement of patients with suppurating wounds is high, and attention to adequate intake of this vitamin is important. The hæmoglobin should be maintained above the 80% level, by blood-transfusion if necessary; and respiratory exercises are of paramount importance both in convalescence from simple uninfected hæmothorax and in empyema cases, in which they should be instituted at the earliest possible moment.

MORTALITY

The gross mortality in the whole series over a period of two to three months, and in most cases more, after coming under the care of the chest unit was 6·5%. Exclusion of the thoraco-abdominal wounds reduces the figure to 6%. Hospital mortality figures must obviously be grossly affected by selection of cases arising from the delay between wounding and reception in hospital. Thus in group 1 of our cases, received 1–3 weeks after wounding, the hospital mortality was just under 4%; in group 2, received in 1–2 days, it was 12%; and in group 3, received in 2–3 days, usually after a long journey back, it was just under 8%. These figures include cases known to have ended fatally after transfer to other medical units, and are thus fairly representative of the base hospital mortality of penetrating wounds of the chest.

SUMMARY

A series of 291 cases of penetrating wounds of the chest from the campaigns in the Middle East between November, 1941, and May, 1943, is reviewed.

Special chest units in mobile warfare are best located at a forward base hospital.

There were 187 hæmothoraces in the series, a third of which became infected. Infection thus remains the principal problem in the management of these cases.

Clotting occurred in only 6% of cases of hæmothorax. Delay in aspiration, infection or an intrapleural foreign body was present in all cases showing clotting. A large clot should be removed as soon as possible.

The treatment of hæmothorax, uninfected and infected, intrathoracic foreign bodies, and thoraco-abdominal wounds is discussed.

The gross mortality for the entire series was 6·5%, which is probably fairly representative of the base hospital mortality of these wounds.

We are grateful to our two colleagues in the team, Major E. H. Rink, RAMC, for assistance and advice on all matters pertaining to anæsthesia, and Captain R. W. Lush, RAMC, for help in the treatment and recording of cases.

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MEASUREMENT OF CIRCULATION TIME WITH SACCHARIN

F. P. DURAS, M D VIENNA
LATE HOUSE-PHYSICIAN, GENERAL HOSPITAL, NORTHAMPTON

RECOGNITION of early heart-failure and its differential diagnosis from affections of the lungs and kidneys is a task often confronting the general practitioner as well as the consultant. At medical schools heart-valve diseases are most commonly demonstrated because they have a richer symptomatology than other heart lesions and are therefore preferred for teaching. But when the young physician goes into practice he is surprised to find comparatively few aortic or mitral lesions; the great bulk of heart-failure is due to myocardial damage. The beginner often stands puzzled before a heart which is affected by other than valve disease. He knows all about thrills, murmurs and accentuated and doubled sounds, but is often unable to detect them in the heart whose muscle is affected, the valves being healthy. The heart may be severely damaged yet percussion may not show signs of enlargement; the sounds are clear, perhaps a little dull, no murmurs are audible. Confronted with such cases even the more experienced have difficulty. Radiology and electrocardiography have helped to clear the fields. But an electrocardiograph and an X-ray plant are not always at the disposal of the general practitioner, and even if they are, correct interpretation of the findings needs long experience.

Measurement of the circulation time offers a simple means of recognising and indexing a differential diagnosis. The velocity of the blood-flow depends on the cardiac

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output, provided the volume of circulating blood remains the same; the cardiac output is inversely proportional to the circulation time. The test, of course, cannot provide the sole basis for a diagnosis any more than radiology and electrocardiography can; but with the clinical and other findings the circulation time is a help, and is easy to do in the home.

Several methods are available, some of them disagreeable to the patient. Histamine injected into the cubital vein causes flushing of the face with a peculiar metallic taste on the tongue. Sodium dehydrocholate intravenously produces a bitter taste when it arrives in the vessels of the tongue. Toxic reactions to sodium dehydrocholate have been reported recently by Leys.[1] Using a standard preparation of a 20% solution, supplied by a reliable firm, he noted "unpleasant" and "alarming" reactions in two cases; a third patient died with symptoms of respiratory embarrassment and circulatory collapse an hour and a half after the injection, but the underlying condition of the patient is not mentioned. Winternitz,[2] who introduced sodium dehydrocholate in 1931 and has used it extensively since, has seen hardly any untoward effects. He seems, however, to have given it up in favour of calcium gluconate. Sodium cyanide in the blood-stream leads to a sudden deepening of the respiration, which is supposed to be due to stimulation of the carotid sinus. With ether in physiological saline injected intravenously one can measure the arm-to-lung circulation time by noting the period which elapses until the ether vapour is detected in the expired air. In tests done at the General Hospital, Northampton, the saccharin method recommended by Fishberg and his colleagues[3] was found satisfactory.

The arm-to-tongue circulation time is measured; 2·5 g. of soluble saccharin is dissolved by heating in 2 c.cm. of sterile distilled water; the solution should be only heated enough to dissolve the saccharin; since if it is heated too much evaporation causes recrystallisation when the needle of the syringe is brought into contact with the solution. The technique is simple if the solution is available in ampoules. The solution is injected into a cubital vein and the patient is told that he will experience a sweet taste which he should announce immediately. To allow for circulatory readjustment after the use of the tourniquet and the venepuncture one should wait at least a minute after inserting the needle before injecting the solution, but then it should be injected as quickly as possible. The time is measured between the injection and the moment when the patient announces the sweet taste (which travels from the root of the tongue to the tip and vanishes quickly). The period can be checked by an ordinary watch, but a stop-watch is better. The normal circulation time as measured by this method is between 9 and 16 seconds. There are no untoward reactions, and the patient finds the sweet taste pleasant.

The circulation time is prolonged in early failure of the left side of the heart (sometimes up to 45 seconds or more); in failure of the right ventricle; in mediastino-pericarditis and pericardial effusion (hypodiastolic failure). Digitalisation reduces the circulation time. In well-compensated valve lesions or hypertension, angina pectoris and arrhythmia without heart-failure, the circulation time is normal. The value of the measurement of the circulation time in differential diagnosis of failure of the left heart and pulmonary affections is obvious. The circulation time is normal in bronchial asthma, prolonged in cardiac asthma. Dyspnœa due to compression of the trachea or bronchi, dyspnœa and cyanosis in emphysema (without heart-failure), and pneumonia have a normal circulation time. It is helpful in deciding whether œdema of the legs, ascites or enlargement of the liver is due to right heart-failure. Thyrotoxicosis, fever and anæmia may shorten the circulation time, and so make recognition of early heart-failure difficult. In congenital interventricular septal defects the circulation time is shortened. In one-sided pneumothorax the circulation time can be very fast, because the heart has to maintain the minute volume through the uncollapsed lung. Measurement of the circulation time may be a help for observing improvement in a case of heart-failure, for the circulation time may diminish before œdema and dyspnœa have disappeared.

1. Leys, D. G. *Lancet*, 1944, i, 196. 2. Winternitz, M. *Ibid*, p. 295. 3. Fishberg, A. M., Hitzig, W. M. and King, F. H. *Proc. Soc. exp. Biol. N.Y.* 1933, **30**, 651.

ILLUSTRATIVE CASE-RECORDS

CASE 1.—A man aged 71 was admitted on May 28, 1942, with acute retention of urine. A prostatectomy was performed on June 3. The prostatic section revealed senile adenoma. A fortnight after the operation the patient developed intestinal obstruction due to right inguinal hernia; this was removed and he was then put on an intravenous saline drip infusion. He did well, but after a few days got œdema of both legs, which was well marked after a further week.

The question put to the physician was whether the œdema was cardiac in origin. The man had a blood-pressure of 190/95 mm. Hg, the blood-urea was 45–60 mg. per 100 c.cm. and there was a trace of albumin in the urine. The apex of the heart was in the 5th intercostal space, two fingers outside the mid-clavicular line; there was no enlargement to the right. The heart sounds were clear and strong; no murmur was audible. There were no râles over the bases of the lungs; the liver was not enlarged or tender. There was no increase in venous pressure, and no abnormal pulsation of the neck veins; no cyanosis and no dyspnœa, even at night. The saccharin test gave a circulation time of 8 seconds. The electrocardiogram showed a left axis deviation, with a deep S in lead 2 (Pardee), confirming the clinical finding of hypertrophy of the left ventricle. The conduction time was 0·14 second. The initial deflections were normal in shape and width, the S-T segment on the isoelectric line, and the T-waves upright. It was considered that the œdema of the legs could not be cardiac in origin. In fact it cleared up after a week, and was probably due to the intravenous saline infusion in an old man.

CASE 2.—A man aged 63 was admitted on June 13, 1942, with severe dyspnœa and cyanosis, cough and pains in the left side of the chest. He had no fever. There was dullness over the left lower part of the chest, about four fingers high, with diminished air-entry and diminished vocal fremitus. The X ray showed opacity in that region, suggestive of fluid. Apart from the dyspnœa and the aching in the chest, he complained of pains in the epigastrium just below the sternum, coming on periodically with indigestion and flatulence. The blood-pressure was 130/100 mm. Hg; there was no enlargement of the heart, the sounds were clear, rather distant, no accentuation, no murmur; the heart action was regular for several minutes, but would then abruptly become irregular and then resume regularity again. The circulation time was 24 seconds by the saccharin test. The ECG showed auricular fibrillation alternating with flutter, widening of the initial deflections, depression of the S-T segment, and negative T-waves in all leads. There was a deep Q-wave in lead 3. A diagnosis of myocardial damage due to coronary sclerosis was made.

CASE 3.—A man aged 59 was admitted on Oct. 3, 1942, because of albuminuria. A week before admission he complained of vague epigastric pains, vomiting and loss of appetite. There was moderate œdema of the ankles and legs. He had a greyish complexion and looked ill. There was no dyspnœa. The pulse was regular but of low volume. The thorax was broad and deep and it was hardly possible to determine the borders of the heart by percussion because of the emphysema; for the same reason the heart sounds were hardly audible. The blood-pressure was 120/80 mm. Hg. There was some dullness over both bases of the lungs with numerous rhonchi. The temperature was normal. The liver did not seem to be enlarged, but the abdomen was slightly tender. The urine was loaded with albumin; no casts were seen. The blood-urea was 96 mg. per 100 c.cm. Because of the impossibility of obtaining a clear picture of the condition of the heart by ordinary clinical methods the circulation time was measured with saccharin; it was prolonged to 22 seconds. The ECG confirmed the assumption of heart-failure; it showed very low voltage and depression of the S-T segment below the isoelectric line in all three leads; the T-waves were invisible in lead 1 and 3 and inverted in lead 2. Autopsy showed severe atheroma of the coronary vessels.

SUMMARY

Measurement of the arm-to-tongue circulation time by the saccharin method is recommended as a routine test of cardiac function in general practice and hospitals. The estimation is simply done in the patient's home and is useful in the recognition and differential diagnosis of heart-failure. No toxic reactions have been seen with the saccharin method. In three illustrative cases its reliability was confirmed by electrocardiographic findings.

I am indebted to Mr. R. O. Lee and Dr. W. M. Robson for permission to give an account of the cases.

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PENICILLIN IN SULPHONAMIDE-RESISTANT PNEUMONIAS

WITH SPECIAL REFERENCE TO STAPHYLOCOCCAL INFECTION AND EMPYEMA *

T. IZOD BENNETT
M D LOND; F R C P
PHYSICIAN TO THE MIDDLESEX HOSPITAL

TREVOR PARKES
M B LOND
PENICILLIN REGISTRAR AT THE HOSPITAL

THOSE who have memory or knowledge of the pandemic of influenza in 1918 eagerly await information as to whether modern methods of treatment can be expected to reduce the mortality which accompanies that disease. During the period before and after Christmas, 1943, we have had the opportunity of testing the value of penicillin in a group of serious pulmonary infections. The cases under review were chiefly—probably entirely—complications of influenza, which at that time appeared to be reaching the proportions of a serious epidemic. Our cases are selected, in that they appeared to be in danger of death and had resisted sulphonamide treatment. They were further selected in that treatment was only adopted after laboratory demonstration that the invading organism was sensitive to penicillin.

The patients came from a wide area, some of them from 50 or more miles from central London. They must not be considered as representing conditions which were at all prevalent, but rather as selected cases of unusual severity among thousands who made an easy recovery from influenza. It will be seen that they fall into two groups :

(*a*) Staphylococcal bronchopneumonia.
(*b*) Empyema of staphylococcal or streptococcal origin.

The 3 cases of empyema were all postinfluenzal and all followed pneumonia.

CASE-REPORTS

CASE 1.—A man, aged 46, of fine physique, admitted to a country hospital for slight phlebitis ; on the day when due for discharge, he developed influenza which failed to clear up as contiguous cases had done. On 4th day temperature rose to 104° F. ; by 5th day signs of severe generalised bronchitis appeared with many râles suggestive of acute pulmonary œdema. Polymorph. leucocytosis ; much frothy sputum containing scanty pneumococci. Blood-culture gave growth of staphylococci, thought to be contaminants. Next day a heavy culture of *Staph. aureus* of hæmolytic type was recovered from sputum. Sulphathiazole by mouth begun ; 44 grammes given during next 6 days. Temperature little affected and rising at end of course. On 11th day condition fair ; X rays, which had shown nothing abnormal on 2nd day, showed extensive consolidation suggestive of bronchopneumonia throughout left lung. White cells 18,000 per c.mm. Sputum : staphylococci profuse.

Physician in charge considered patient to be dying and sent him by ambulance 40 miles to Middlesex Hospital. On admission, very ill ; dyspnœa, paroxysmal cough, profuse purulent sputum, labial herpes. Rhonchi throughout chest ; localising signs slight, but suggesting consolidation of left upper lobe. Patient delirious at night. White cells 21,800. Sputum appeared to be pure pus ; profuse growth of *Staph. aureus*.

Sodium penicillin, 20,000 units by intramuscular injection 3-hourly, begun and continued for 9 days, Total dose 1,440,000 units. Two days after beginning this treatment slight improvement, sputum less but still purulent, cough severe, fever lower, physical signs unchanged, organism less profuse in sputum. After a week of penicillin, general condition considerably better, cough less and sputum diminished, though still mucopurulent. Physical signs confined to generalised rhonchi. Evening temperature falling. White cells 15,200. X rays still showed dense consolidation. Three days later, patient afebrile, good appetite, little cough and very little sputum, which still contained sparse flecks of pus. Physical signs less definite. A few staphylococci still present on culture of sputum. From this time patient was clearly out of danger, practically afebrile and very well except for profound weakness. As long as sputum was recoverable (i.e., until about the 4th week of the disease and a fortnight after admission to the Middlesex Hospital) staphylococci, although scanty, were present.

He was discharged on the 44th day of his illness still somewhat weak but walking well and without pulmonary signs or symptoms either clinically or on X-ray examination.

CASE 2.—A woman, aged 60, whose illness began with sudden onset of aching pains in the limbs, shivering attacks and slight cough. Admitted to hospital on account of acute right pleural pain beginning on the 3rd day of the disease. On examination, consolidation of right, and to a lesser extent of left, lower lobe, confirmed by X rays. Sulphamethazine, 20 g., given over the next 3 days without improvement. After a week in hospital, her general condition continued to become worse and pyrexia was maintained. Sulphathiazole, 30 g., administered, again without clinical improvement. X rays showed increase in the area of consolidation at right base with persistent consolidatjon at left base. It was thought that the disease must inevitably be fatal.

Many examinations of the sputum during this period showed a constant heavy growth of *Staph. aureus* which was penicillin-sensitive. She was transferred to the Middlesex Hospital and on the 17th day of disease penicillin was begun ; 20,000 units was given intramuscularly 3-hourly, and continued until 1,700,000 units had been given in 12 days. Temperature slowly settled and the patient was apyrexial after the 5th day of penicillin treatment. Her general condition slowly improved but she was profoundly exhausted. Abnormal physical signs gradually disappeared and within a month there was no definite abnormality on physical or X-ray examination. Until her cough finally became unproductive a month from beginning of treatment, the *Staph. aureus* was almost constantly present.

CASE 3.—A nurse, aged 21, previously in good health, reported sick with cough, headache, shivering and pains in the back and limbs. Temperature 101° F., but no other abnormal physical signs. A diagnosis of influenza was made, and during succeeding 6 days temperature settled to normal and general condition improved. On the 3rd day of disease sho developed pain in right side of chest and signs of early lung involvement at right base. X rays showed no abnormality. On the 7th day temperature suddenly rose to 102° F., pulse-rate to 106 and respiration to 30 per min. She complained of a severe right pleural pain and her general condition became much worse. Signs of consolidation were detected at the right base, confirmed by X rays next day. Sulphathiazole was begun. Fever continued and general condition showed no improvement. After 14 g. of sulphathiazole had been administered, sulphadiazine was substituted, 7 g. being given. Sputum gave heavy growth of *Strep. viridans*. Moderate pyrexia continued but general condition improved a little over the next few days. On 17th day of illness temperature rose again to 103° F. ; patient had several mild shivering attacks, cough became more troublesome and general condition deteriorated rapidly. Sputum gave heavy growth of *Staph. pyogenes*, penicillin-sensitive. X ray showed further consolidation of right lower lobe. Sulphathiazole, 22 g., administered during next 48 hours, but temperature was maintained and the patient's general condition became increasingly grave.

On the 19th day of disease treatment with penicillin was begun, 20,000 units of sodium penicillin being given intramuscularly 3-hourly. Treatment continued for 3 days ; total 460,000 units. Temperature rapidly fell and the patient was afebrile from 3rd day after treatment. Her general condition improved rapidly during the first 48 hours ; appetite returned and there was considerable improvement in her morale. Abnormal physical signs in the chest rapidly disappeared, and an X ray, taken 3 weeks after the start of penicillin therapy, showed that the condition had completely cleared. The patient continued to bring up a moderate quantity of mucopurulent sputum for 3 weeks after treatment, when no further sputum was recovered. Examination of sputum after penicillin treatment had been discontinued revealed that staphylococci were still present. Within a month from beginning of treatment patient was quite well.

CASE 4.—A sturdy young woman, aged 23, without relevant previous history beyond an attack of bronchitis at age of 20, returned from leave to duty on Nov. 27, 1943, quite well. Next morning she felt ill, was admitted to sick quarters, found to be febrile with signs suggestive of pneumonia, and transferred to hospital. On admission she was flushed, skin dry, temperature 103° F., pulse-rate 120, respirations 40 per min. Signs suggesting lobar pneumonia at right base

* Published with the authority of the Penicillin Committee, Middlesex Hospital.

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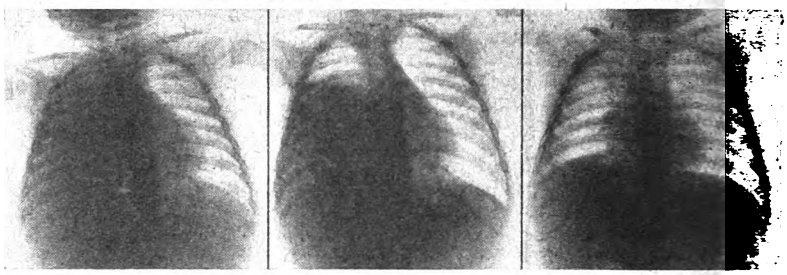
Sulphathiazole was started immediately and 64 g. given over 9 days without substantial improvement. The day after admission a little purulent sputum was coughed up and *Staph. pyogenes* isolated. Sputum was scanty, and varied from purulent and thick to fluid, non-viscid and bloodstained. On 7th day, 50 c.cm. of watery semipurulent fluid aspirated from right pleural cavity; sterile on culture. Subsequent aspirations failed to yield fluid. On 12th day sodium penicillin in saline was given by 3-hourly intramuscular injections of 20,000 units per dose. By the 16th day patient had been almost afebrile for 48 hours; the pulse- and respiration-rates remained alarmingly raised, though there was neither cough nor sputum and the physical signs in the lungs were slight. She was obviously desperately ill, pale and breathless but quite lucid. White cells 27,000. On the 20th day, white cells remained at 27,000. The evening temperature for some days had been about 100° F. Pulse and respiration still very rapid. A few c.cm. of watery straw-coloured fluid were aspirated from right pleural cavity, where 20,000 units calcium penicillim was injected. Aspirated fluid sterile on culture with scanty pus cells. Next day there was sudden deterioration in her condition, delirium, incontinence of fæces and great difficulty in feeding. White cells 13,000. During the next week her condition improved notably in all respects. Eating well, but emotional and resentful. X-ray films taken at weekly intervals up to this time demonstated gradual clearing of the right lung, starting from apex and descending. The last film still showed some opacity of right lower lobe without evidence of effusion. White cells 7500. Hardly any evening rise of temperature; weakness still severe. Penicillin continued from 12th to 24th day of disease, 1,610,000 units being given in all.

For fully a week this patient's condition appeared hopeless, but it is to be noted that the most desperate stage of her illness was at a time when active infection appeared to have been abolished.

CASE 5.—A healthy female baby, aged 10 months, was suddenly taken ill with high fever, dyspnœa and cough. Pneumonia was diagnosed by her doctor, who treated her with sulphanilamide, a total of 4 g. being given. At the end of a week the patient's general condition was becoming steadily worse and she was admitted to hospital. On admission, temperature 104·5° F., pulse-rate 170, respirations 50 per min. Severe dyspnœa and cyanosis; distressing cough. Physical signs of consolidation of right lower lobe, confirmed by X rays. Sulphathiazole, 6 g., given over 5 days. No obvious response; though the high fever abated, moderate fever persisted and general condition remained unsatisfactory. Two weeks later, signs of empyema appeared; X rays demonstrated complete opacity of right side of chest (fig. *a*) and thick yellow pus was aspirated from the right pleural cavity. This grew *Staph. aureus*, sensitive to penicillin. Next day the temperature suddenly rose to 105° F. pulse-rate to 170, respiration to 60. Patient became obviously extremely ill, and it was feared that she would not survive surgical intervention. Systemic treatment with sodium penicillin was begun, 5000 units being given by intramuscular injection 3-hourly; this was maintained for 10 days. During this period, on alternate days, pus was aspirated from the right pleural cavity and 20,000 units of calcium penicillin in 5 c.cm. of saline substituted. The general condition improved rapidly, and within a week the patient was afebrile. Pus removed at the third aspiration was found to be sterile and thinner; aspirations were continued, but penicillin was not introduced after the fourth aspiration. The exudate became increasingly thin until it was ultimately serous. Signs of fluid in the right pleural cavity rapidly diminished and the lung expanded (fig. *b*). Within 3 weeks of the start of penicillin therapy aspiration yielded no fluid, and within a month serial X rays, which had shown a steady shrinkage of the empyema, showed total re-expansion of the lung (fig. c), complete disappearance of the empyema and only slight residual pleural thickening. The patient on discharge was gaining weight rapidly and appeared perfectly well.

CASE 6.—A healthy young nurse, aged 21, contracted influenza in common with many other nurses in a fever hospital. The disease did not clear and signs of a left lower lobar pneumonia appeared. On the 7th day of the disease there were signs of a left pleural effusion, confirmed by X rays. Fluid aspirated from the left pleural cavity contained β-hæmolytic streptococci. She was given a course of sulphapyridine, but showed no response and was transferred to a general hospital. A 2nd course of sulphapyridine was given without success and pleural fluid again gave a growth of β-hæmolytic streptococci on culture; these organisms were found to be resistant to all of the sulphonamide drugs. Repeated aspiration of the left pleural cavity yielded 5–11 oz. of turbid fluid and on each occasion the same organism was demonstrated. By the 24th day the patient was still maintaining a moderate pyrexia and her general condition was becoming steadily worse. She was transferred to the Middlesex Hospital, very ill and exhausted, with signs of a moderate effusion at the left base; β-hæmolytic streptococci were demonstrated in the pleural fluid and sputum. A course of systemic penicillin was started, 20,000 units of the sodium salt being given intramuscularly 3-hourly; 420,000 units were given over 4 days; 50 c.cm. of turbid fluid was aspirated from the left pleural cavity and 60,000 units of sodium penicillin in 10 c.cm. of saline substituted. The patients general condition improved rapidly during the next 48 hours and she became apyrexial. Repeated aspiration of the left pleural cavity yielded slightly turbid fluid, which proved to be sterile. Examination of sputum failed to demonstrate the β-hæmolytic streptococci again. The pleural effusion slowly disappeared and within a fortnight she appeared well, X rays showing a very small residual effusion.



a b c

Radiograms of chest in case 5. (*a*) Massive right empyema before penicillin therapy. (*b*) A week after beginning of treatment. (*c*) Just before discharge, a month after beginning treatment.

CASE 7.—A healthy young nurse, aged 22, was suddenly seized with fever, headache, general aching and dry cough. No abnormal physical signs. Influenza diagnosed. For 4 days temperature rose, reaching 104° F. Respirations 36, cough more troublesome. Scarlatiniform rash on body, signs of consolidation left lower lobe, confirmed by X rays. β-hæmolytic streptococci in sputum. White cells 8000. Sulphathiazole administered but changed to sulphadiazine on account of vomiting. In 7 days 40 g. of sulphonamides taken; very slight improvement in general condition; mild fever persisted and streptococci constantly in sputum. On 13th day sudden left pleural pain and rise of temperature to 104° F., suggestive of fluid at left base. Fever maintained, condition deteriorating. On 14th day hæmolytic streptococci profuse in sputum, and in fluid removed from left pleural cavity. White cells 23,000, rising to 40,000 on 16th day when 500 c.cm. of turbid fluid was removed and 50,000 units of calcium penicillin in 50 c.cm. of saline substituted. Systemic penicillin in the form of 3-hourly intramuscular injections of 20,000 units of the sodium salt begun. All subsequent samples of pleural fluid sterile; contaminants only in sputum. Steady and progressive improvement for 10 days, after which temperature, pulse and respiration were normal and effusion steadily diminishing. After first 24 hours of penicillin therapy, in spite of sterilisation of sputum and pleural exudate and fall in temperature, the patient was desperately ill with circulatory collapse, low blood-pressure and oliguria. This condition slowly improved. Three days after beginnng penicillin treatment her white cells had fallen to 21,000 and they fell to 17,000 within a week.

DISCUSSION

Penicillin in influenza.—The observations here recorded must not be thought to suggest that penicillin is of supreme value in the treatment of influenza. All our cases were seen late in the disease, when secondary infection was well established, and there is at present no evidence to suggest that penicillin will abort the primary infection usually believed to be due to a virus. More-

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over, it must be noted that nearly all our cases were staphylococcal infections, and past experience has been that the staphylococcus is a rare invader during epidemic influenza. Bacteriological records from the 1918–19 pandemic are confined to those countries where pathological observation was available and are therefore limited. The numerous reports from such countries make it clear that the streptococcus, Pfeiffer's bacillus and the pneumococcus are commoner secondary invaders; indeed, almost the only notes of staphylococcal pulmonary complications are those from Malta, where Adam Patrick and Sir Archibald Garrod reviewed a series (Patrick 1919), and the description of an outbreak in a North American camp by Chickering and Park (1919). In one of the Canadian base hospitals in France staphylococcus was reported in 20% of fatal cases (Tytler, James and Dobbin 1919) but in other areas this percentage was much lower.

When, therefore, we record the successful treatment of a number of staphylococcal cases, we do not suggest that this is likely to be of wide application; before penicillin can be claimed to be of paramount value in influenza, records must be obtained of its effect in severe bronchopneumonias due to infection by Pfeiffer's bacillus, the streptococcus and the pneumococcus.

Our observations suggest that penicillin in no way alleviates the profound debility which follows complicated influenza.

Penicillin in staphylococcal pulmonary infections.—The fact that we record 4 cases of severe staphylococcal bronchopneumonia without a death strongly suggests that penicillin is of great value in the treatment of this serious complication. The rarity of staphylococcal invasion of the lung has already been alluded to. Woollenman and Finland (1942) have recorded 8 cases of pneumonia of this type, occurring during an influenza epidemic in Boston, Mass. Their observations were derived from autopsies and their paper gives no clue as to whether this represents a 100% mortality or a much smaller figure. It may be said in general that records of staphylococcal pneumonia have become more numerous during the last decade, but are almost without exception observations on small groups of cases, and there is no suggestion that the condition has ever been seen in anything approaching epidemic form. On the other hand, it may well be that staphylococcal infection in general is becoming more frequent, and should there be another influenza pandemic the *Staph. aureus* may prove highly important in the production of mortality.

In the 4 cases here recorded, sulphonamide drugs had been employed in full dosage over a sufficient period for cure to be expected if it was obtainable by the use of such agents. Penicillin treatment was in each case begun late—on the 12th, 17th, 20th and 21st day of the disease—but, except in case 4, each of these patients noted improvement in appetite, relief of headache and a considerable general improvement in health within 48 hours of the commencement of treatment; in case 4, the patient, without such striking symptomatic improvement, was emphatic in stating that the injections from the outset made her "breathe better."

In case 1 the effect in diminishing the amount of purulent sputum was immediate and progressive, and in case 3 penicillin appeared to turn the scale rapidly in the patient's favour; in her case it seems probable that the staphylococcal invasion had occurred much later than in the others and was closer to the beginning of pencillin treatment. In case 4 it must be noted that although sulphathiazole had failed to cure it appeared to lower the temperature notably; and, perhaps as a result of its administration, the semipurulent pleural exudate was sterile on culture, both before and after penicillin treatment had begun.

In all 4 cases there was a state of profound asthenia for a considerable period after the infection seemed to have been abolished. In 2 of them this clinical state, which seems to be a toxic peripheral vascular failure, was so severe that it presented a dangerous threat to life for some time.

Dosage.—In 3 of these cases very large amounts, approximately 1½ million units of penicillin were given. The reason for this was the difficulty of deciding when the infection had been overcome. The temperature and the white-cell count are perhaps the most reliable guides to this, the profound postinfluenzal prostration and the tendency for staphylococci to persist in the sputum being the factors which make it difficult for the clinician to decide when to stop administration. In case 3 only half a million units were used because there was more rapid and dramatic evidence of recovery, probably owing to the treatment having been begun close to the time of staphylococcal invasion.

In all cases we have employed full doses from the outset, in order to combat the possibility of converting a sensitive organism into a resistant one, a calamity which has been seen both in patients and in laboratory observations (Rammelkamp and Maxon 1942).

Penicillin in empyema.—One of the cases of staphylococcal pneumonia discussed above was complicated by a seropurulent effusion, sterile on culture, which probably represented an early empyema aborted by sulphonamide therapy. A single injection of 20,000 units of calcium penicillin was made into the pleural cavity and this local condition disappeared during the subsequent fortnight. Apart from this case, we give notes of three others, in 2 of which there was an important seropurulent pleural exudate, requiring aspiration on several occasions and giving at the outset profuse growths of β-hæmolytic streptococcus. In each case a large dose of calcium penicillin, followed later by a much smaller dose, was injected into the pleural cavity. In each case the initial dose was followed by complete sterility of fluid aspirated and desperate illness changed to convalescence with the absorption of residual fluid; at the date of writing we believe this absorption will be complete. The fourth case of empyema was in a baby and was a massive purulent exudate complicating a staphylococcal pneumonia. The organism was present in abundance in the pus and the child was referred to a surgeon by a pædiatric expert who believed that rib-resection offered the one frail hope of saving life; the surgeon considered operation to be so dangerous that penicillin treatment was adopted. This was instituted by intramuscular injections of the sodium salt with aspiration of pus and local injection into the pleural cavity of the calcium salt. Dramatic improvement followed this treatment, the empyema becoming more and more easy to aspirate until after 10 days of treatment the patient is now apparently convalescent and the clinical and X-ray appearances indicate that there will be no residual disease in lung or pleura.

The results obtained in these cases permit hope that they represent a new phase in the treatment of empyema. The introduction of sulphonamide therapy has provided a new clinical spectacle in the form of occasional clear pleural exudates which are sterile, contain a few polymorphonuclear cells, and become absorbed without further incident. Our present observations go further and suggest that not only does penicillin, by local injection combined with systemic treatment, offer the prospect of cure in severe and sulphonamide-resistant cases but that it can even bring about cure without rib-resection in cases where the pleural cavity already contains large quantities of pus.

The treatment of empyema by local injection has hitherto been a story of failure. Even the sulphonamide preparations, apart from the fact that most of them are intensely irritant to the pleura, have failed in the presence of copious pus, probably because of the presence of inhibiting chemical substances. One of the most remarkable properties of penicillin is its capacity to act in the presence of large quantities of pus and bacteria, and its use by local injection in empyema may prove revolutionary in the treatment of this condition. Some systemic treatment is probably necessary in such cases to prevent reinfection from neighbouring tissues.

SUMMARY

A group of 4 cases of staphylococcal pneumonia, 2 of streptococcal empyema and 1 of staphylococcal empyema are described.

Of these cases, 6 were wholly and 1 partially resistant to sulphonamide therapy.

All were treated with penicillin and all recovered completely.

The results are discussed with particular reference to the value of penicillin in complicated influenza, and its value as a non-surgical treatment of empyema.

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We are indebted to Dr. G. E. Beaumont, Dr. A. Moncrieff and Mr. D. H. Patey for facilities for observing some of these cases. Most of the laboratory procedures were carried out in the Bland-Sutton Institute of Pathology by Dr. F. R. Selbie and Prof. James McIntosh to whom we express our special thanks. Part of the expense was defrayed by a grant from the Medical Research Council.

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COMPLICATIONS OF TRILENE ANÆSTHESIA

A. R. HUNTER, MD GLASG, FRFPS, DA
ANÆSTHETIST TO MANCHESTER ROYAL INFIRMARY

FOR some fifty years the very real dangers of chloroform as an anæsthetic have been known and an efficient substitute has been widely sought. When trichlorethylene ('Trilene') was described by Hewer and Hadfield (1941), it seemed that the desired drug had been found, but more recent publications suggest that it also has its drawbacks, to which too little attention seems to have been directed. I have used trilene and oxygen in the chloroform bottle of a standard Boyle's apparatus as an adjuvant to nitrous oxide mainly during long intracranial operations, though, for reasons which will become apparent later, I regard it as the best of a bad job and take steps to reduce the amount required to an absolute minimum. I have used it also to tide a patient over from nitrous oxide and oxygen to nitrous oxide, oxygen and ether, but have stopped the practice as rather too dangerous. A little 'Vinesthene' or vinesthene-ether mixture is just as effective and completely free from the danger of upsetting the cardiac rhythm.

CARDIAC DISTURBANCES

The main cause for anxiety during trilene anæsthesia is the common disturbance of cardiac rhythm. In my first 50 cases it occurred 12 times. Characteristically chloroform produces cardiac upsets during the late second and early third stage. Trilene, on the other hand, resembles cyclopropane in that the severity of its effects on the heart is a measure of the depth of anæsthesia. The recovery of normal cardiac rhythm coincides with the return of the respiratory rate to normal levels. The most common arrhythmia and that most characteristic of trilene is extrasystoles They were described in Hewer and Hadfield's original paper and have been mentioned by almost all writers on the subject (Gordon and Shackleton 1943, Ayre 1943, Griffiths 1942). One form of this irregularity is pulsus bigeminus, in which every second beat is an extrasystole. Such a condition is well known as a complication of digitalis therapy. When pulsus bigeminus develops under trilene it is often possible to distinguish two separate blood-pressures corresponding to the two sets of beats—e.g., the normal contraction will register at 130/90 and the extrasystole at 80/55 mm. Hg. As the irregularity disappears it will often be noticed that first every third and then every fourth and every fifth beat is an extrasystole.

The first report of serious cardiac disturbance was made by Lloyd Williams and Hewspear (1942). They noted complete irregularity of the heart with a pulse deficit in the course of the administration of trilene during thyroidectomy for a non-toxic goitre. Their observation has been confirmed by Clendon (1943) and by Gordon and Shackleton (1943). The actual nature of this irregularity must remain doubtful until electrocardiographic records are obtainable. The possible explanations seem to be auricular fibrillation or multiple focus ventricular extrasystoles. The latter appears to be the more likely since extrasystoles of decreasing frequency are found during the recovery period. Recent work by Geiger (1943) and by Waters and his colleagues (1943) has confirmed this surmise.

So far two fatal cases of cardiac vagal inhibition have been recorded. One death occurred during an operation for empyema and perhaps it is not fair to blame the trilene (Hewer and Hadfield 1941). The second, however, took place during a straightforward herniotomy in a healthy girl aged 4 years (Haworth and Duff 1943). A third case of cardiac failure under trilene has recently been recorded by Goldschmidt (1943), but the disturbance may have been secondary to anoxæmia; this patient recovered after his lungs had been inflated with pure oxygen and his precordium vigorously slapped with a wet towel. Such incidents must make us most careful in the use of trilene. One thing seems certain—that the injection of solutions containing adrenaline in no way augments trilene cardiac irregularities.

The disturbances of cardiac rhythm which arise during trilene anæsthesia seem to be explicable on the basis of vagal over-activity. Simple bradycardia undoubtedly has such a mechanism. Extrasystoles probably arise when increase in vagal tone reduces the inherent rhythmicity of the sino-auricular node to such an extent that some other focus initiates a cardiac contraction before the normal pacemaker is ready to do so. Patients who have a single initiating focus will develop pulsus bigeminus as the anæsthesia becomes deeper, while those with several foci will develop the irregular type of disturbance of rhythm. It is worth noting that the prognosis of vagal inhibition, which is likely to respond to cardiac puncture, &c., is rather better than that of ventricular fibrillation; consequently trilene, which may be expected to produce only vagal inhibition, should in this respect be safer than chloroform, which may produce both types of cardiac arrest.

During long intracranial operations I have noticed that the addition of trilene to the anæsthetic mixture has had a deleterious effect on patients exsanguinated to the point of fall in blood-pressure. It would therefore seem unwise to use trilene freely in the presence of surgical shock.

RESPIRATORY AND NERVOUS DISTURBANCES

The rapid panting breathing of trilene anæsthesia is familiar to all anæsthetists. Culbert (1943) has suggested that anoxæmia is the main cause of the rise in respiratory rate but in my experience this occurs regularly in the presence of full oxygenation, though it is perhaps not so well marked. Like the changes in cardiac rhythm the tachypnœa is probably due to enhanced vagal irritability, in particular to overactivity of the Hering-Breuer reflexes. As a result the acts of inspiration and expiration are brought to a premature end, so reducing the depth and increasing the rate of respiration. Thus breathing becomes rapid and shallow, and effective air entry into the lung alveoli is diminished to such an extent that anoxæmia ensues. The administration of a mixture rich in oxygen, by increasing the partial pressure difference between the gas breathed and the alveolar air, increases the rate of oxygen exchange and consequently eliminates any secondary rise in respiratory rate due to anoxæmia.

Delay in recovery of consciousness was noted once by Gordon and Shackleton (1943). Durrans (1943) has recorded 3 cases of *mental confusion* persisting for some 24 hours after a trilene anæsthetic. It is noteworthy that in all the cases of this complication so far recorded, 'Pentothal' has been used to induce anæsthesia. Is it possible that trilene interferes with the detoxification of pentothal, or can the anoxia of deep trilene anæsthesia be the operative factor, as is the case in the encephalopathy which sometimes follows nitrous oxide anæsthesia? I have not met with delayed recovery even after lengthy intracranial operations, nor is it mentioned as a complication of accidental industrial narcosis (Stuber 1931).

Trigeminal anæsthesia.—Hewer and Hadfield (1941) pointed out that trichlorethylene has been used to relieve trigeminal neuralgia, owing to its selective action on the fifth nerve. The characteristic form of poisoning by trilene in industry is a bilateral loss of sensation in the distribution of the fifth nerves, and sometimes optic neuritis. I have no personal experience of such a complication, but 3 cases of fifth-nerve sensory loss after trilene anæsthesia in a closed circuit have been published by McAuley (1943).

So far *convulsions* seem to have been reported twice during trilene anæsthesia, but in both cases (Garland 1942, Culbert 1942) cyanosis and respiratory arrest preceded the convulsions and consequently the question arises whether the trilene or the asphyxia was to blame. In both cases the convulsions ceased after adequate oxygenation had been restored.

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CONCLUSIONS

From the practical point of view the properties of trilene seem to be as follows. It is an anæsthetic of low volatility which is not explosive under normal working conditions; it is non-irritant and is active in low concentrations, so that it does not evoke reflex coughing or gagging when added with reasonable care to nitrous oxide and oxygen; it does not appear to cause salivation or to increase the bronchial secretion; it occasionally gives rise to severe excitement during the second stage and sometimes fails to anæsthetise adequately, especially for abdominal operations. There is no evidence that the frequency of postoperative emesis is reduced by its use. The published figures for this complication (Hewer and Hadfield 1941, Haworth and Duff 1943) do not differ materially from those given for other agents in the extensive analysis published by Waters and his colleagues (1937) at the University of Wisconsin. In a personal series of 62 major neurological operations carried out under nitrous oxide, oxygen and trilene, 22 cases vomited after recovery of consciousness and 8 of these did so more than three times.

Trilene must be used with caution because:

(1) It is capable of producing serious disorders of cardiac function.

(2) It produces a well-marked increase in vagal tone, with a corresponding enhancement of the irritability of the vagal reflexes. The degree of vagotonia is proportional to the depth of anæsthesia. Since the disturbances of cardiac rhythm seem to be caused by vagal irritability, deep anæsthesia affords no protection against them. The two fatal cases of cardiac failure under trilene anæsthesia recorded appear to have been due to vagal inhibition.

(3) It may produce convulsions during anæsthesia and may leave drowsiness or mental confusion for some hours afterwards.

(4) It may put the fifth and perhaps the second cranial nerves out of action for a considerable time.

The indications for the employment of trilene must therefore be cogent, and the drug must not be used indiscriminately when other agents such as the intravenous barbiturates or vinesthene would serve. Trilene can properly be used when a non-explosive agent is essential and a closed circuit will not afford adequate protection, and in cases where a non-irritant anæsthetic is necessary. It should not be used as a routine adjuvant to gas and oxygen even in non-premedicated patients, for other less dangerous agents are available. It is a less effective though less dangerous agent than chloroform, and can therefore be substituted for chloroform when muscular relaxation is not essential. Carbon-dioxide absorbers are notorious for their tendency to build up high concentrations of anæsthetic drugs; since trilene is safe only in small quantity such machines should not be employed for its administration. The manufacturers have lately heard of two cases in which serious toxic effects have followed the administration of trilene in a closed circuit and they suggest that until these have been investigated trilene should not be used with a closed circuit (*Lancet* 1944).

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PNEUMOCONIOSIS IN BOILER-SCALERS

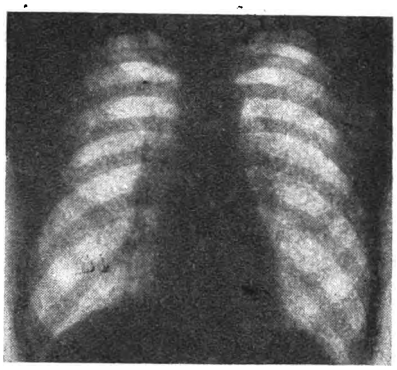
P. G. TODD
M D LOND, M R C P
SQUADRON-LEADER RAFVR

DAVID RICE
M B CAMB
SURGEON LIEUT RNVR

THE increasing use of mass miniature radiography necessitates wider recognition of boiler-scaling as a cause of pneumoconiosis. The air in the interior of boilers becomes heavily laden with dust particles from the hammers and wire brushes used to remove the scale from the water-heating pipes. The composition of this scale varies according to whether fresh or salt water is used, but it consists mainly of iron, sodium, magnesium and calcium, as chlorides, sulphates and phosphates. An insoluble residue we assume to be silicate, being insoluble in aqua regia.

We here report a case additional to the few on record.

A man of 40 complained of cough and shortness of breath. He had had a cough, especially at night and early morning, for 8–10 years, and it was worse since service in northern climates. Sputum was scanty and had never been blood-stained. Appetite had been poor for some years and he had lost weight. He had no history of lung disease and had never been in hospital.



Radiogram showing "snow-storm" type of infiltration.

At the age of 11 he commenced work in a ship repair yard as a boiler-scaler, but after 14 years he went to sea because "the job was doing him no good and he wanted to clear his chest." He started as a trimmer and later changed to engineman in fishing trawlers. Between leaving his first job and going to sea he worked for three months in a quarry, brickmaking. There is no family history of any lung trouble.

He was a small, bent, oldish-looking man, edentulous and slightly cyanosed. His chest was small and fixed in type. Trachea central. Apex-beat not displaced. Some increase in resonance to percussion with greatly increased tactile fremitus. Numerous râles and sibilant rhonchi in all areas. Radiography (see figure) showed a "snow-storm" type of infiltration of both lungs equal in intensity from hilum to periphery. No mediastinal displacement; some glandular enlargement. No marked previous apical tuberculous lesion. The film suggested either miliary tuberculosis or pneumoconiosis and he was admitted to hospital. He remained apyrexial and radiography of the abdomen revealed no calcified glands. No tubercle bacilli were found in the sputum (3 examinations). Blood-count: red cells 4,750,000 per c.mm.; red-cell volume 45%; white cells 6200. Sedimentation-rate 7 mm. in the first hour (Westergren). Kahn test negative. Urine normal.

Dunner (1943) states that the diagnosis is made solely on radiography and previous occupational history. He says that the symptoms bear no relation to the length of time spent in scaling; he found that, as in this case, patients look prematurely old and describe the cough as worse in the morning.

The diagnosis lies between: miliary tuberculosis (acute or chronic), pneumoconiosis, Boeck's sarcoid, carcinomatosis, syphilis, and bronchiolitis obliterans. The radiological appearances are described as of three types: in the early stages there is reticulation, which is later followed by diffuse snowflake mottling, leading in very advanced cases to gross fibrosis.

We wish to express our thanks to Wing-Commander J. W. Patrick for permission to report this case, and to Flight-Sergeant G. Jackson who took the X-ray films and Sergeant R. A. Bacon, RAF, who carried out tests on scale taken from ships' boilers locally.

References at foot of previous column

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Medical Societies

NUTRITION SOCIETY

THE society held a conference on Feb. 5 at the London School of Hygiene to discuss

Budgetary and Dietary Surveys

Sir JOHN ORR, FRS, who presided, said that since nutrition will be important during the postwar reconstruction it is clearly the duty of those engaged in research to supply the legislator with sufficient knowledge so that appropriate action can be taken. The Hot Springs conference made it clear that one of the main causes of malnutrition is the defective distribution of food. A well-educated public opinion is needed to prepare the way for improvements in nutrition, and propaganda to this end is urgently necessary.

Mr. A. G. JONES, of the Ministry of Food, described the "budgetary" method used for assessing nutrition among different groups of the community. A careful record is kept of purchases and consumption of foodstuffs, from which a rough indication of the amounts of nutrients received, and their cost, may be obtained. Allowances have to be made for many contingencies, including lodgers and visitors, members of the family having meals out, food obtained otherwise than by purchase, and the feeding of domestic animals. One of the many difficulties in conducting these surveys arises from the abnormal behaviour of housewives when under observation. There may be a tendency to seek favour by using foodstuffs which are known to be approved by nutrition experts, and waste will often be reduced to a minimum for the same reason. In examining the relation between income and money spent on food a difficulty may arise over the exact definition of housekeeping money, which covers very different items in different families.

Mr. E. R. BRANSBY, of the Ministry of Health, explained that surveys are necessary to throw light on national food habits, to reveal dietary deficiencies, and to examine the effect of factors such as education, and economic and national customs on the cooking and consumption of foodstuffs. The information so obtained is invaluable in planning a national programme for the improvement of nutrition. Surveys may be conducted in several ways, according to whether the individual, the family, the institution, or even a whole nation is taken as the unit to be studied. We can study the diet of individuals in minute detail, with close observation of every meal taken, but surveys of national nutrition must be based on such statistics as are available of food production and imports per head of the population. Surveys based on the family as a unit have been found most convenient for obtaining information relating to different groups of the community, classed according to locality, employment or level of income. There are three distinct methods of procedure. In the "precise" method, which is more convenient for individuals than for families, every item of food is weighed or measured in some other way before it is eaten. This is the most accurate method, but also the most laborious. The "log-book," or "budgetary," method depends on keeping a careful account of the amounts of food eaten over a certain period. The quantities used are estimated by the housewife in homely measures, or by comparison with diagrams or models, and are checked against the amounts purchased. This method seems the best for most types of survey. Finally we have the "questionnaire" method, in which housewives are examined once only by a skilled interviewer about their food consumption during the particular week in question. This procedure is economical in labour. The questionnaire method seems particularly liable to error. The other methods are less open to criticism, and it seems probable that although the margin of error for individual results may be high, the error for large groups is less serious. There is urgent need for the compilation of accurate food tables, and for their uniform use in different surveys. In order to save labour it is desirable to know the size of groups which must be taken to get results which are statistically sound. Thus it is wasteful to survey 300 families if, as has been recently found, equally reliable data may be obtained by the examination of 100 families.

Mr. F. LE GROS CLARK, whose paper was read by Mr. A. L. BACHARACH, discussed the division of food among the family. Budgetary surveys give us information about the supply of food to the purchasing unit, usually a whole family, but do not tell whether the food in that unit is equally distributed. Certain members may be overfed and others underfed. The problem is essentially one for the sociologist, but the nutrition worker is vitally interested in the answer. The necessary information must be obtained through the housewife, who will be inclined to underestimate her own dietetic deficiencies. In practice very few housewives will weigh every item of food consumed by the members of their families, so some less ambitious plan must be evolved. From evidence as to the total amount of food purchased by the family, however, combined with the housewife's testimony as to its normal distribution at the table and an accurate estimate of the intake of at least one child, it should be possible to draw tentative conclusions about the intake of each individual. The examination should be made by someone who already knows the housewife well, and a plausible explanation of the purpose of the work should be given.

Miss M. GRANT spoke of the difficulties inherent in survey work. Keeping a weighed record is often impossible, is always time-consuming and laborious, and for this reason is often inaccurate. Moreover, when people know they are under observation their behaviour is in many cases altered. To minimise such complications people being surveyed should have no link with the investigator other than that connected with the survey.

Miss D. F. HOLLINGSWORTH mentioned the work of the War-time Food Survey. They had studied the effect of prices on the purchase of foods, and the nutrients obtained from rationed and unrationed foods. In some parts of the country—e.g., Scotland—they had studied the amount of vegetables consumed.

Miss M. W. COOPER thought that the value of the questionnaire method should not be underrated; in the course of a short interview it was possible to get much information from the housewife.

Mr. L. MOSS, of the War-time Social Survey, outlined the organisation of large-scale surveys. This research unit is mainly engaged in obtaining information for Government departments. In view of the importance of nutrition in national policy there is a need for the extension of nutrition surveys to take account of social factors, and to obtain data representative of large groups of the population. Surveys have already been made on the kinds of foods eaten in different parts of the country, on the consumption of particular foods such as oatmeal, potatoes and milk, and on cooking habits. Useful lessons in conducting such surveys have already been learnt. Since the nutrition worker cannot personally supervise the collection of data his instructions should be precise, detailed and foolproof. Such instructions, moreover, must be based on a first-hand knowledge of the people to be examined, and collaboration with the sociologist is essential. The team of workers actually conducting the survey should have some knowledge of nutrition, so that they will fully appreciate the nature of the information required. Adequate sampling is necessary to ensure that the results are truly representative of the groups under investigation. In collecting and analysing results the sociologist must be employed not only to help in interpretation, but to advise on the use of the special mechanical devices by which the enormous masses of data may be analysed and tabulated without undue expenditure of time and effort.

Prof. M. GREENWOOD, FRS, dealt with the statistical validity of methods used in budgetary and dietary surveys. It is reassuring that the results of dietary surveys have given a value of 3200 calories for the energy requirement of the "average" man, which is identical with the figure obtained long ago by direct calorimetry. In a community where nutrition is in a state of equilibrium further estimations of the calorific intake would be superfluous, as merely giving additional confirmation of figures which have already been fully substantiated. If the state of

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nutrition is unstable, however, calorific estimations may furnish an early warning of the disequilibrium. Such warnings have already been obtained on two occasions in mining areas, when economic depression resulted in calorific intakes of only 2800 cals. This is only slightly above the danger line of 2600 cals. calculated from the intake of communities on the point of starvation, and the children in the areas affected were definitely subnormal. In carrying out dietary surveys it is essential that the rules of random sampling should be followed, even if their rigid application involves time and inconvenience.

Wing-Commander YATES, RAF, urged that general information should be obtained on large groups, and this should be followed up by studying a smaller group from the larger one in more detail and with more accuracy.

Lieut. JOHN YUDKIN, RAMC, emphasised the value of correlating data obtained from such surveys with physiological data. Such work in 1942 had shown that mothers and children of families in which the expenditure on food was less than 7*s*. per week per head were of poorer physique, had lower hæmoglobin values, and were weaker than those families which spent more on food.

Prof. J. R. MARRACK thought it wrong to assume that errors involved in budgetary surveys would normally cancel out.

Prof. A. L. BOWLEY, of the Oxford Institute of Statistics, discussed the problem of family income and variation of expenditure on food. In organising a survey of household budgets it is first necessary to define the class and unit, usually family or household, which are to be investigated. The household may be taken to include those who sleep on the premises and have their meals together. The household income is taken as the combined income of all its members, and expenditure is income, less saving, plus debt. The fraction of the income which we have to consider is that which is available for buying food, and the difficulty in its estimation is usually met in consideration of expenditure rather than of income. The earner's personal allowance must be classified under such headings as insurance, clothing, food, tobacco, alcohol, travelling and amusements. Even when these items are worked out there is difficulty in assessing the amount spent on food, for in war-time members of many families will often get meals at canteens, either free or for payment. Before starting a survey therefore the investigator must decide exactly how he is going to deal with all these complications so as to ensure uniformity in the tabulation of his results. In general, as income increases the expenditure on food increases absolutely, but decreases as a proportion of the total expenditure. Variations in expenditure on food may however be due not only to the income level but to differences in needs, and in tastes and habits. In comparisons between different localities another cause of variation arises in differences in prices, particularly rent. To avoid unnecessary difficulties the group to be surveyed should be limited to one social class at a time. When by suitable mathematical analysis data have been obtained from surveys on the money expended on food, the main problem is to decide how far adequacy of nutrition depends on the level of income, and how far on taste, habit, knowledge and other individual factors. Orr's conclusion in 1936—that only about half the population could then afford a diet completely adequate for health—is, of course, based on average values. Families with the same incomes and needs may be either well or poorly fed. There may indeed be a call for propaganda to persuade some families to spend more on food, and less on things which in the official view are less necessary. But even if it is important to decide how much money should be spent on food, we are left with the problem of how it should be spent. If hopes of future social and economic security are realised, and the schemes for the provision of milk and meals for school-children are developed, any residual malnutrition will be due not to poverty but to unwise spending. It is here that the guidance of the nutrition expert is needed.

Mr. D. CARADOG JONES, of the University of Liverpool, read a paper on the relation of expenditure on food to other family expenditure. "Cost of living" may be defined as the amount spent by the family in an assigned period of time, and is a function of such variables as the standard of living, size and composition of family, and price levels. Other basic needs such as rent, fuel and light, and clothing compete with food as items of expenditure, and since we do not know the minimum requirements for health of the former needs any estimate as to the most appropriate allocation for food must be provisional. Probably the best data available of the costs of the various items are contained in a collection of working-class budgets made by the Ministry of Labour. These show that expenditure on food amounts to 40% of the total expenditure among town-dwellers, as compared with nearly 50% among dwellers in the country, where living is cheaper. Income level influences both the amount spent on food, and its relation to other items of expenditure. Thus food accounts for 50% of expenditure in the poorest families, 40% in average working-class families, and only 20% in families with incomes over £700 per year, although in the richer families the absolute amount spent on food is much greater than in the poor families. The "subsistence" budget of Sir William Beveridge has been based on an allowance for food at levels consistent with scales laid down by the League of Nations Technical Commission on Nutrition (1936–38) and by the British Medical Association committee on nutrition (1933). To meet basic needs each adult must spend 7*s*. 6*d*. per week on food, 1*s*. 6*d*. for clothing, and for a family of four people 10*s*. for rent, 4*s*. 6*d*. for fuel and light, and 7*s*. 5*d*. for miscellaneous items. The very small allowance for miscellaneous expenditure seems open to criticism.

Mr. C. MADGE said that due allowance must be made for the fact that families of the same income group and same composition spend varying amounts on food. In a survey in Leeds in 1942 it was found that among families in the same group, some spent 41% of the income on food and saved 14%, while others saving 5% spent 45% on food. These data were statistically significant and it was clear that other social factors, besides those already mentioned, were at work in determining expenditure on food.

Mr. B. WOOLF thought that the BMA standard of nutrition was too low. On this standard there was no necessity to increase the production of milk and other protective foods; this was in marked contrast to the view now generally held by nutrition experts like Sir John Orr. The monetary allowance for food given in the Beveridge report falls slightly below what is necessary to secure adequate nutrition, and the provision for clothing is so very low that it would inevitably reduce still further the amount that such families could spend on food.

Sir JOHN ORR, in his concluding remarks, emphasised that on the basis of his experiments when extra protective foods are added to the diet of children there could be no question about the beneficial results obtained. The Government was committed to a scheme to improve the nutrition of this country to a level that would give optimum health. People could not be criticised if they spent some of their income, that might otherwise be spent on food, on pursuits calculated to enliven drab lives. The real solution was to so adjust finance and wages that adequate food could be purchased by all, leaving a sufficient margin for other necessities, and a reasonable amount of pleasure.

TABULAR STATEMENT OF TUBERCULOSIS.—A remarkably graphic presentation of tuberculosis in the USA has been prepared by Dr. Carroll E. Palmer, of the US Public Health Service, for the National Tuberculosis Association. Statistics from the political subdivisions of the country have been assembled in the form of tables and graphs. The tables contain, for each of the three-year periods 1919–21, 1929–31 and 1939–41, data on population, deaths from tuberculosis, and death-rates by age, sex, and race. Graphs for each area show mortality by age and by sex. The idea is one that might be copied over here. The book may be obtained from the National Tuberculosis Association, 170, Broadway, New York, 19.

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Reviews of Books

Advances in Pædiatrics

Vol. I. Editor: ADOLPH G. DE SANCTIS, MD, New York Postgraduate Medical School. (Heinemann. Pp. 306. 21*s*.)

IN this attractive presentation of new things in pædiatrics each section is a well-written monograph, reviewing all the current literature over the last few years. The first deals with toxoplasmosis, which is caused by a protozoon. This recently recognised disease of man has been responsible for certain forms of congenital encephalitis and hydrocephalus, the results of which are specially apparent during the newborn period, infancy and early childhood, for acute non-suppurative encephalitis in childhood, and in adults for a meningitis-like disease associated with atypical pneumonia. In the section on virus diseases, the theory of the alimentary route of infection of poliomyelitis, and virus pneumonia and herpes are reviewed. The section on chemotherapy in diseases of infancy and childhood is up to date and the various sulphonamide drugs are fairly evaluated. A discussion of electro-encephalography makes no undue claims; it states "while the findings of some investigators are suggestive, definite co-relation between the type of behaviour disorder and the electro-encephalographic abnormalities is not yet possible." Other sections cover the rôle of vitamin K in hæmorrhage in the newborn period, the surgical treatment of persistent ductus arteriosus, the premature infant and tuberculosis, and endocrinology; and there are short abstracts of other advances.

Nelson Loose-Leaf Medicine

Renewal pages. (Nelson.)

THESE renewal pages are of a high standard. The article on malaria is completely rewritten by Colonel C. F. Craig, who gives almost all that is really known with praiseworthy brevity. Blackwater fever is, however, omitted. Schistosomiasis is reviewed by Colonel R. P. Strong. Recent views on Simmonds's disease and anorexia nervosa are dealt with by Dr. S. C. Werner as fully as such rarities deserve. Dr. D. W. Richards on pulmonary œdema, Drs. W. J. Kerr and F. L. Chamberlain on abnormal mechanisms of the heart, and Dr. C. M. Campbell on general paralysis are all good, and Dr. L. E. Hinsie on psychiatric disorders is so comprehensible that he must be wrong.

EXTRA PHARMACOPŒIA, SUPPLEMENT TO VOL. I.—The need for economy in war-time and the healthy speed-up in applying pharmaceutical discovery have profoundly altered the official British and US pharmacopœias and have led to the issue of addenda and national formularies. These changes have seriously outdated the 22nd edition of the Extra Pharmacopœia (vol. I), published in May, 1941. The Pharmaceutical Society with exemplary promptness has issued a supplement to vol. I (Pharmaceutical Press. Pp. 48. 2*s*.) which includes all the amendments to *BP*, *BPC* and *USP*, as well as recent orders affecting supply of drugs, newly approved names for drugs, and a further list of proprietary names. The carton fits neatly into the cover of the bound volume.

New Inventions

NIGHT SPLINT FOR KNOCK-KNEES

THE MERMAID

THE combination of knock-knees and flat valgoid feet is exceedingly common. Some of these cases are due to rickets, and the possibility of renal rickets should be particularly remembered. Nowadays most of the patients seem to have no underlying defect of bone construction, and in these the deformity can properly be regarded as due to relative over-weight or over-use. Almost all these cases will respond to wedged heels and a few directions as to diet and activity. The heel of the shoe is raised 1/4 to 3/8ths of an inch on the inner side, and the patient is not allowed to put his weight on his feet until he has his altered shoes on. These children are allowed to run about so long as they are fresh, but they must not be allowed to get tired, or to stand still; for the growing bone has limited elasticity and is plastic when exposed to prolonged weight-bearing strain. Perhaps they should also be told how to avoid any habitual positions likely to promote valgus of foot or knee.

But there remains a small proportion of patients in whom the valgus angle is severe when first noticed or fails to improve with simple measures. For these patients a more persuasive form of treatment is necessary. Knock-knee irons are objectionable, for they have to be worn in the daytime, are not easy to put or keep in place, and very much hamper the child's natural activities. I therefore devised a "night" splint which is easily made, easily understood and applied, and comfortable. The splint need only be worn at night. It consists of two tapering gutter splints riveted back to back and suitably padded; fitting and application are straightforward; and the children take to this treatment readily. The splint is, of course, used in addition to "wedged heels" and the standard instructions.

It will be seen that when the lower limbs are on the splint the child resembles a mermaid! The figures illustrate the splint, its application, and the effect in one instance.

I have used this splint for 10–12 years with the utmost satisfaction, and I do not remember having had to do an osteotomy for knock-knees in a child during that period.

G. R. GIRDLESTONE, FRCS.

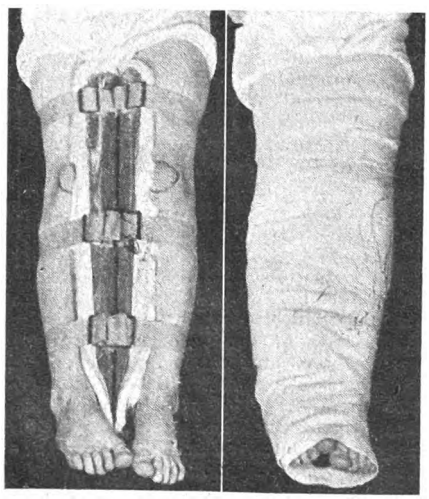

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Fig. 1

The splint strapped on. Plenty of cotton-wool padding is used, especially between the knees, and this padding is so adjusted that when the straps are fastened and bandages put on a mild corrective force is applied to the knees. The patellæ have been outlined to show position.

Fig. 2

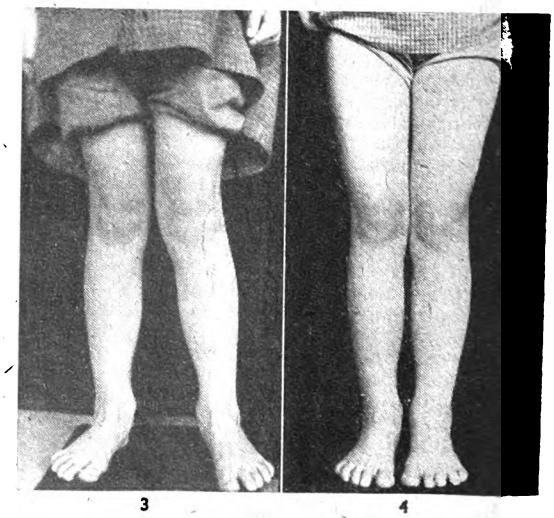
A flannel bandage is then applied to include the feet, which should lie close together and parallel to each other.

Fig. 3

October, 1942, before treatment.

Fig. 4

August, 1943, during treatment.



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THE LANCET

LONDON: SATURDAY, MARCH 4, 1944

REACTIONS TO THE WHITE PAPER

"THE cat will eat fish, but will not wet her feet." Almost everybody applauds the Government's intention to organise a National Health Service offering the best available medical care to the whole community, but many are loth to face the changes this demands.

The most definite protest so far comes from the voluntary hospitals, which are asked to participate in the Service under their own managements, but are not to be repaid the whole cost of doing so. Their income, they point out, comes largely from the hospital saving schemes, which have no less than 11 million contributors. And if everyone in the country is to be given the right to full treatment in hospital without payment, many if not all these people will see no reason to go on contributing; a fine voluntary organisation will be ended, and the hospitals will be the poorer. This is regrettably true, but must be viewed in perspective. The hospital saving movement has been immensely valuable, but in the nature of things could never embrace everybody. The time has come, most of us feel, when it would be well for every citizen to be covered by a contributory scheme; and, though the citizen's personal contribution will be supplemented from rates and taxes, that is essentially what the white-paper proposes. The Government could preserve voluntary insurance only by sacrificing their wider compulsory insurance; they would have to abandon the whole for the sake of the part. The hospitals should accept compulsory insurance as a natural and desirable extension of their own voluntary insurance; whatever the virtues of personal thrift, they are outbalanced, medically, by the possible benefits of comprehensive care for all. But then, say the hospitals, how are we to live? The answer is that the Government, and most of the public, sincerely want them to live, and are unlikely to ask them to bear a burden that would be insupportable without contributory schemes. If the voluntary hospitals are to retain their amateur status it seems obvious that they must not derive the *whole* cost of maintenance from public funds; but many of them already have substantial endowments, and if they make it their aim, in individual ways, to demonstrate medicine at its best, they will surely not lack benefactors to help them do it. The condition of their survival in independence is that by old tradition or new initiative they should continue to provide a little something some others haven't got. Regular payment of the bulk of their expenses by the National Health Service may even help them to concentrate on this valuable function.

In our profession anxiety centres for the moment round the powers given to the Central Medical Board and the presumed tendency of the scheme towards salaried employment for all general practitioners. The Board, a small body formed mainly of doctors "working under general guidance on policy from the Government but independently in its individual decisions," is to serve as the employer of general practitioners in the public service and will be concerned with their fair distribution between different areas. From the national standpoint it is indefensible that some areas should have too few doctors while others have too many, and something has to be done about it. Under National Health Insurance every qualified man or woman has the right to take up panel practice wherever he or she likes; but as soon as the Government set themselves to meet the medical needs of the whole population they must be able at least to ban new entries, in the public service, to over-doctored districts. There is no question of moving anyone who is established in practice, and no question of directing anyone to work in a given place. All that is proposed is that "any practitioner wishing to set up a new—or take over an existing—public service practice in a particular area will seek the consent of the Board." It is hard to see how a National Health Service could dispense with control to this degree, and it seems an over-statement to credit the Board with the further power "to direct newly qualified practitioners to whole-time public service." Technically it will have no power to direct anyone into the public service at all (though there may be few alternatives), and those who do join are only temporarily, if at all, denied the right to see private patients which, rightly or wrongly, their seniors all retain: the Board, says the white-paper, must "be able to require the young doctor during the early years of his career to give his full-time to the public service where the needs of the service require this." The *British Medical Journal* is possibly correct in its diagnosis of "the unmistakable direction in which the mind of the Government is moving—and that is towards the institution of a whole-time salaried medical service, with the proviso that private practice shall not be denied to those who want it and that doctors in the public service may provide it." The *Journal* suspects that health centres are "wanted, at least by the authors of this report, not so much for what they may be as for what they make possible—first steps towards State control and salaried employment." But the proposals of the white-paper in this connexion are avowedly experimental, and the first steps could be retraced if necessary. The Government, and many other people, think it likely that general practice by salaried doctors working from health centres could be made a success; but this certainly remains to be proved. The scheme gives an opportunity for proof. At least for several years to come, the large majority of general practitioners in the National Health Service will be working separately, or in partnerships of their own; and before this situation changes there should be every chance of judging the merits and demerits of health centres of various kinds. If either the public or the doctors dislike them they will have failed, and the profession should be able to use its considerable influence to resist their extension. But they cannot convincingly be damned in advance.

In other quarters the Government is held to have conceded too much in allowing private practice within the National Health Service. Few of course go so far as to suggest that the whole profession should be forced into the scheme; indeed it is arguable that the Service will be more efficient if a proportion of practitioners and consultants remain outside it,

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serving as competitors or controls. On the other hand, there are strong reasons for deciding that anyone who does enrol should renounce the right to accept fees personally from private patients.[1] We all know that a large proportion of the public think they can get better attention from a panel doctor by consulting him privately, and it would be a pity if this unfortunate weakness of National Health Insurance were carried forward. One of the elder statesmen of the profession writes to us:

"I have no hesitation in saying that the proposals of the white-paper will result in a new class distinction. The man who is well enough off to pay privately for his medical services will believe he is getting something better than he would have got otherwise, and those who see their doctor through the Service will also believe that the man who pays is getting something better. I do not pretend to say how this could be avoided except by insisting that there should be no private practice; and that goes against all my convictions."

Over this awkward problem the white-paper skates somewhat lightly when it declares that no-one must "have reason to believe that he can obtain more skilled treatment by obtaining it privately than by seeking it within the new service." Yet in a sense this optimistic remark contains the ultimate solution; the belief that better treatment is obtainable privately cannot be removed except by making this untrue. A really sound service cannot, in fact, be built on prohibition (especially prohibition of things that many people are accustomed to do, and see no harm in doing): it must rather be based on a demonstrable capacity to deliver the right goods. Moreover, the shortcomings of panel practice need not be perpetuated intact if they are properly used as warnings. A lay authority on social insurance points out that the medical profession is one of high integrity and fine ideals: "only underpaid and overworked practitioners, as unfortunately some often are under National Health Insurance, will feel inclined to make good by competing for private patients what they cannot achieve by treating those under a general scheme."[2] In the long run only good conditions of work and remuneration bear good fruit, and the Government must forgo any lingering desire to gather figs from thorns. In the long run too the public will prefer the best of several kinds of service offered them. The profession today is honestly divided over the relative advantages and disadvantages of individual practice, group practice, attendance fees, capitation fees, salaries, the voluntary hospital system, the municipal clinic, and much else. A period of genuine experiment would enable us to reach more agreement over essentials and adjust our emphasis accordingly. The great virtue of the white-paper, in present circumstances, is that it promotes unity but permits diversity.

1. See *Lancet*, 1943, ii, 390, 491.
2. Prof. Hermann Levy, *Observer*, Feb. 20.

HEALING OF SURFACE EPITHELIUM

Loss of surface epithelium due to simple abrasion is made good in the first place by the migration or sliding over the defect of cells from the edge of the wound. Mitoses are not often found in this advancing edge but occur regularly at some distance from it. Healing by migration was first observed in epidermis by LOEB and in the cornea by RANVIER in 1898. Since then it has been confirmed many times over.[1] Yet the observation is often greeted as a novelty. This must be attributed to the standard textbooks of pathology, only one of which[2] describes healing by migration. Proof of the fact lay formerly in day-to-day examination of section material made from small healing wounds in laboratory animals. These sections revealed the steady, but on the whole rapid, progress of epithelium over the defect in the absence of any signs of cell division. Mitoses were found some distance away. Migration was recently demonstrated macroscopically by chance in the corneas of rabbits possessing pigment at the limbus.[3] When corneal epithelium was destroyed by small localised droplets of mustard gas, the presence and shape of the ulcers that formed were revealed by green colouring with fluorescein. As the stainable area decreased in size in the course of a few days, pigment gradually advanced towards the ulcer leaving a gap behind in the limbus. The progress of healing was thus made visible by fluorescein, and the method by the movement of pigment. MANN[4] has now shown that injuries due to various chemicals as well as those due to abrasion heal in the same way. The method could be seen in every instance provided that the ulcer was not more than about 2·5 mm. from the pigmented limbus. When healing was complete, a second migration of the same pigment could be induced if another lesion was made not more than 2·5 mm. from the line where the first had stopped. Step by step in this manner pigmented epithelium was drawn towards the centre of the cornea and replaced at the limbus by non-pigmented conjunctival cells. MANN has also shown how this disturbance of pigment may be distinguished from the scattering which occurs in vitamin-A deficiency, or from actual proliferation as in injuries due to arsenical gases.

This mobility, or amœbism as LOEB called it, is indeed a curious property of epithelium which we are accustomed to think of as fixed. How does the epithelium become freed and what is the stimulus for migration? How is it that the cells at a distance multiply instead of those at the edge? To understand fully delay or failure in healing these are some of the questions that must be answered. WIGGLESWORTH[5] has suggested that an activating substance, liberated by wounding, starts migration, and that this substance is thermolabile. In experiments on insect epidermis, migration failed to occur after heat wounds, and MANN'S experiments on the cornea tend to confirm these results. Might healing and the spread of grafts be hastened by addition of activator? All observers agree that normal migration is rapid. It is probable that the state of the supporting collagen or connective-tissue bed is at least as important as activator. An adequate supply of ascorbic acid is known to be needed for collagen formation, and FELL and DANIELLI[6] have shown that the base of healing wounds contains a large increase of phosphatase. Damaged collagen can act as a foreign body and thus cause delay, while bacterial infection prevents healing.

According to WIGGLESWORTH, those mitoses which appear at a distance do so in response to cell sparseness,

1. Arey, L. B. *Phys. Rev.* 1936, **16**, 827.
2. MacCallum, W. G. Textbook of Pathology, Philadelphia, 1940.
3. Mann, I. and Pullinger, B. D. *Proc. R. Soc. Med.* 1942, **35**, 229.
4. Mann, I. *Brit. J. Ophthal.* 1944, **28**, 26.
5. Wigglesworth, V. B. *J. exp. Biol.* 1937, **14**, 364.
6. Fell, H. B. and Danielli, J. F. *Brit. J. exp. Path.* 1943, **24**, 196.

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which in its turn is due to the migration. Since it is the nature of epithelial cells to hang together rather than to exist alone in isolation in a matrix, sparseness puts the remaining cells on the stretch. It is not unreasonable to suppose that this is a stimulus for cell multiplication. The old observations and their new interpretation suggest that the key to improved wound healing is as likely to lie in aiding the forward movement of migration as in the direct stimulation of mitosis.

TRAUMATIC HÆMOTHORAX

A HIGH proportion of penetrating wounds of the chest are complicated by blood in the pleural cavity, and this can be disabling on its own account apart from increasing the risk of infection. The memo on the treatment of chest wounds [1] issued by the DGMS British Armies in France in 1917 laid down that large effusions of blood into the pleura required active aspiration, but many moderate-sized effusions of the last war were left alone, some to be fully absorbed, some to be incompletely absorbed and lead eventually to chest rigidity, and the rest to become infected, need drainage and leave the patient with a total or subtotal empyema, with its difficult and tedious treatment. Two dangers of early aspiration are put forward by those who advocate masterly inactivity—that too early expansion of the lung may cause a recurrence of pulmonary hæmorrhage, and that the pleural exudate may be infected by the aspirating needle. Yet S. R. ARMSTRONG [2] demonstrated at Bailleul in 1915 that aspiration even on the first or second day is not attended by fresh bleeding, and in this issue NICHOLSON and SCADDING report the same from the Middle East—in their series of 187 hæmothoraces there was no recurrent hæmorrhage from this cause. One of their patients developed fatal secondary hæmorrhage from an intercostal vessel on the 12th day, and another from a metallic foreign body in a lung riddled with tuberculosis, but neither of these catastrophes was likely to have been influenced by early aspiration. TUDOR EDWARDS [3] maintains that bleeding from the lung ceases as a result of hæmatoma-formation, which should have sealed the low-pressure vessels in the lung within 24–48 hours. The Russian surgeons, MATSYEV, LINBERG and ACUTIN,[4] say there is no argument in favour of leaving blood in the pleural cavity except the problematical danger of reactionary hæmorrhage, which no-one has observed. The suggestion that infection may be introduced by the aspiration is a criticism of technique rather than of principle, and the Army surgeons of the last war were satisfied that this danger too was negligible.[2] SAUERBRUCH, ZENKER [5] and other German surgeons likewise favour early aspiration. The advantages are that it relieves high intrapleural pressures, removes an excellent culture medium for the growth of micro-organisms, produces early pulmonary re-expansion and if infection supervenes limits its area. Further, early aspiration prevents massive clotting and gross fixation of the chest by organisation of fibrin deposited in the pleura—the "frozen" chest.

Penetrating wounds of the chest show not only a higher incidence of hæmothorax (60–80%) than those recorded under peace conditions in the United States (31%) but also a much higher rate of infection. NICHOLSON and SCADDING report infection in 33% of their cases of hæmothorax, and TUDOR EDWARDS reported 22% in 204 cases due to bombing in this country, compared with only 1·4% recorded by ELKIN and HARRIS [6] in the United States. The peace-time experience may have encouraged the view that hæmothorax can be left to look after itself unless cardiac or respiratory embarrassment is present, but in TUDOR EDWARDS'S series cases aspirated within 48 hours showed an infection-rate of 12·5%, compared with just over 20% in those aspirated later; this suggests that the early removal of blood has a definite effect on the incidence of sepsis. There has been much discussion on replacing the fluid by air. Most observers agree that large air-replacements are inadvisable, particularly if infection develops, and advocate introducing only enough air to prevent discomfort while enabling all blood to be withdrawn. As NICHOLSON and SCADDING remark, the introduction of a small quantity of air may help the radiologist to locate residual pockets. Blood in the pleural cavity rarely clots, but they record 12 examples of clotted hæmothorax for which operation was done, 6 infected and 6 uninfected; in 3 of the uninfected cases small foreign bodies were present in the clot. The mechanism of this interesting condition remains unexplained, but in their experience clotting can be ascribed to one of three factors—delay in aspiration, infection, or intrapleural foreign body. As regards chest fixation, or frozen chest, due to non-removal of blood which remains uninfected, both American and British surgeons who have to treat the later stages of chest wounds express concern at the amount of residual respiratory disability. It will help to minimise this disability if all traumatic hæmothoraces are aspirated early and if aspiration is repeated until the pleura remains dry.

The work of GRISWOLD and ORTNER [7] raises speculations as to the value of autotransfusion of the blood removed from the chest or abdomen after penetrating injuries. A large number of deaths during war are due to hæmorrhage into the chest and abdomen, and although enough blood and plasma have up to now been available to supply the needs of these cases exceptional circumstances might produce a shortage, and the patient's own blood might then fill the gap. Autotransfusion has proved feasible in aseptic conditions such as ruptured ectopic gestation; but when the bleeding arises from trauma there would seem to be a chance of introducing bacteria with the effused blood. GRISWOLD and ORTNER deny that perforation of a hollow viscus contra-indicates the transfusion of blood found in the peritoneal cavity, for the bacteria are destroyed in the blood-stream, though they agree that bile in anything but the smallest quantities may cause death if introduced into the circulation. In their technique the blood collected from the peritoneal or pleural cavity by suction is returned to the circulation through a funnel with gauze filter. Even with penetrating chest wounds they do not think there is a serious risk of blood-stream infection. The low

1. Official History of the War, Surgery (1922), vol. I, p. 360.
2. *Ibid*, p. 355.
3. Edwards, A. Tudor, *Lancet*, 1943, i, 97.
4. Linberg, B. E. *Khirurgiya*, 1940, 9, 97 (abstr. *Bull. War Med.* 1942, 2, 455). Matsyev, I. E. *Ibid*, p. 100 (abstr. *Bull War Med.* 1941, 1, 370). Acutin, M. N. *Ibid*, 1940, 10, 3 (abstr. *Bull. War Med.* 1941, 2, 94).
5. Sauerbruch, F. *Disch. militärärztl. Z.* 1942, 7, 1. Zenker, R. *Chirurg.* 1942, 14, 129.
6. Elkin, D. C. and Harris, M. H. *Ann. Surg.* 1941, 133, 688.
7. Griswold, R. A. and Ortner, A. B. *Surg. Gynec. Obstet.* 1943, 77, 167.

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incidence of infection in peace-time hæmothoraces may justify their views for such cases, but in a war casualty autotransfusion would be justified only if neither blood nor plasma was otherwise available and the patient was grossly exsanguinated.

Annotations

RUBELLA AND CONGENITAL MALFORMATIONS

THERE have been plenty of examples in medical history of a clinical picture suddenly emerging out of jigsaw pieces at which generations of doctors have gazed unseeingly. Gregg, in South Australia, may have provided another example, by connecting a rubella-like illness in the mother with cataract and other congenital abnormalities in her child; but though the possibility remains he cannot yet be said to have proved his case.

In 1941 Gregg [1] reported 78 cases of congenital cataract in babies born between December, 1939, and January, 1941, whose mothers with few exceptions had suffered during the early months of pregnancy from an exanthem diagnosed as german measles. In at least 44 of them a congenital lesion of the heart was also detected, while the appearance of the cataracts was unlike the congenital types reported previously. Such an unexpected observation clearly called for further study not only to substantiate the evidence of this association but to determine whether the mother's illness was in fact rubella, at what stage of pregnancy it had produced an effect on the fœtus, and whether similar results might follow other infectious diseases. Inquiries on these lines are reported by Swan and his colleagues [2] from the Adelaide Institute of Medical and Veterinary Science, but it is impossible to draw safe conclusions from their figures on the main issue—does the occurrence of rubella, or other acute infectious disease, during pregnancy affect the chances of the baby being born with congenital defects? Practitioners in the states of South Australia were asked to report on all children, whether malformed or not, born of mothers who had suffered from acute exanthemata during pregnancy. Unfortunately, however, for the years 1939 to 1941 only cases with congenital abnormalities were reported. In 1942 both positive and negative cases were included, and of 28 infants born of mothers having rubella in that year 12 had congenital defects. But the doctors were not circularised until October, 1942, and it is not clear how these data were collected and whether there was still a tendency to report the positive and omit the negative cases. The statistical requirements are, therefore, not met—all babies born of the defined mothers should be observed together, preferably with some comparable group of babies born of mothers whose pregnancies were not accompanied by any of the diseases in question. Taking the figures as they stand we have a selected sample of 49 mothers who had rubella during pregnancy and gave birth to 31 infants with congenital defects. The inquirers could find no evidence that the disease diagnosed as rubella was in fact anything but rubella, but the doubt must remain, for even fever clinicians find rubella difficult to diagnose with certainty. Division of the data by the time of pregnancy at which the disease appeared showed that for the 31 infants with congenital defects the illness in the mother had in 25 cases been in the first two months of pregnancy whereas for the 18 infants born healthy the illness had in each case been later than the second month. The defects noted include not only cataract but deaf-mutism, heart disease, microcephaly and mental retardation, and perhaps renal and dental changes as well.[3] This association between incidence of defects and stage of pregnancy at which rubella occurred seems to constitute the main evidence for some causal relationship. More extensive and better controlled observations must be made before we can be sure of it. In this inquiry there was too little material on other infectious diseases to draw any conclusions, though in 2 cases congenital defects followed mumps and in 1 case "influenza," so that too remains for further work.

From his analysis of 294 cases of congenital malformations in Liverpool in the decade 1923–32, Malpas [4] concluded that the earliest change is a modification of the nutrition of the embryo, and he established a correlation between the incidence of the commoner malformations and maternal age and parity. In his view although some malformations are of genetic origin the greater number are either caused or conditioned by maternal environmental factors. Warkany and his colleagues [5] in Cincinnati have produced cleft palate in rats by feeding the mother rats on a deficient diet, and they quote other observations in animals pointing to a relationship between dietary deficiency—especially in vitamin A—and the incidence of hare-lip and cleft palate. The Australian report, however, raises an entirely different possibility, that the nutrition of the embryo may be affected by virus infection in the mother. No doubt the study is being carried further out there, but it should also be followed up in maternity and children's hospitals in this country. Exanthemata during pregnancy are rare, so it should not be difficult to demonstrate an association with congenital abnormalities if one exists. The lay public have always held that congenital malformations have an extrinsic explanation—from being frightened by a dog to falling downstairs—and it will be strange if the influence of a mild illness in the first months of pregnancy, accompanied by a rash, has escaped attention.

PHENIODOL FOR CHOLECYSTOGRAPHY

THE phthalein derivatives were shown thirty years ago to be excreted in the bile, and many attempts have been made to find one of them which is non-toxic and opaque to X rays, so as to show up the gall-bladder. Compounds with an element of high atomic number are required, because as Calthrop [6] points out the radiopacity of an element depends on the number of electrons surrounding its nucleus. The halogen compounds have proved most suitable, and latterly most contrast media have depended on iodine (atomic number 53) for their opacity. The various preparations of the disodium salt of tetriodophenolphthalein (iodophthalein *BP*), given by mouth, all taste nasty and in a considerable proportion of patients produce nausea, vomiting and diarrhœa. Given intravenously they were more effective, but also more toxic, so much so that intravenous administration has largely been discontinued. In 1940 Dohrn and Diedrich [7] in Berlin introduced an entirely new contrast medium, β-(4-hydroxy-3 : 5-diiodophenyl)-α-phenyl propionic acid, and this was tested clinically by Kleiber [8] and put on the market as 'Biliselectan.' A year later, W. Baker,[9] working in Oxford, devised a method of preparing the substance, and J. H. Burn [9] reported that it was well tolerated by animals. Clinical trials followed, and the compound was given the official name of pheniodol; several British firms have now taken up its manufacture. The free acid is a white crystalline powder which is insoluble in water. It is readily soluble in weak alkali but in this form is extremely unpleasant

1. Gregg, N. McA. *Trans. ophthal. Soc. Aust.* 1941, **3**, 35.
2. Swan, C., Tostevin, A. L., Moore, B., Mayo, H. and Black, G. H. B. *Med. J. Aust.* 1943, ii, 201.
3. Swan, C. *Ibid*, p. 411.
4. Malpas, P. W. *Lancet*, 1933, ii, 1151; *J. Obstet. Gynæc.* 1937, **44**, 434.
5. Warkany, J., Nelson, R. C. and Schraffenberger, E. *Amer. J. Dis. Child.* 1943, **65**, 882.
6. Calthrop, G. T. *Brit. J. Radiol.* 1944, **17**, 60.
7. Dohrn, M. and Diedrich, P. *Dtsch. med. Wschr.* 1940, **66**, 1133.
8. Kleiber, N. *Ibid*, p. 1134.
9. Kemp, F. H. *Brit. med. J.* 1943, ii, 674.

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to the taste. Several preparations are supplied as sugar-coated granules, others as a fine powder readily suspended in water. The dose is from 3 to 6 grammes, according to the patient's weight. In their reports on its clinical application, Kemp [5] and Calthrop [6] say that it is safe and reliable, and gives shadows as dense as those obtained with intravenous iodophthalein, without its dangers. Some patients notice a slight burning sensation in the mouth and throat, and some complain of nausea, vomiting, diarrhœa or slight discomfort on micturition, but these symptoms are seldon severe. On the whole, the new medium seems to be more effective and less unpleasant to take than iodophthalein.

LUNG DISEASE IN BOILER-SCALERS

Research-workers looking up a subject in which they are interested are usually confronted with an appalling number of articles in many languages. They find it refreshing therefore to enter an almost virgin field of inquiry. One of this sort is the pneumoconiosis of boiler-scalers. More strictly the term should be boiler-scalers and flue-cleaners, for the same men perform both operations. The distinction, moreover, is of some importance because W. E. Cooke [1] in his original paper in 1930 showed that the boiler scale analysed contained only 6·4% of insoluble siliceous matter compared with 26·5% in the flue dust, the total silica contents being 10·3% and 32·4% respectively. He described the case of a man of 35 who had worked for 9½ years as a boiler-cleaner and who had symptoms and X-ray appearances suggestive of advanced silicosis. Post-mortem examination revealed generalised patchy fibrosis in both lungs, with tuberculous lesions in the right upper lobe, and the dried lung tissue showed an abnormally high content of insoluble and total silica. Cooke had little doubt that the pneumoconiosis preceded the tuberculous infection. In the following year Williams [2] reported 6 cases. In the one that came to autopsy there was a diffuse "anthracosis" with relatively slight formation of fibrous tissue, and tubercle bacilli were found only on guineapig inoculation. He thought it likely that boiler-cleaning encourages the development of pulmonary fibrosis. Elsewhere in this issue Todd and Rice give clinical and X-ray details of a man of 40 who was for 14 years a boiler-scaler and later developed cough and shortness of breath.

Last autumn Dunner [3] described the clinical and radiographic appearances in 12 boiler-scalers, all of whom had sought medical advice for chest symptoms such as pain, dyspnœa and (in 2 cases) small hæmoptyses. The clinical picture resembled that of chronic bronchitis and emphysema, and in no case were tubercle bacilli found in the sputum. The X-ray findings were comparable with those of Williams and were of three types. The first showed a uniform mottling over both lungs like "chronic" miliary tuberculosis, or the "snowflake" mottling of silicosis. The second type had, besides the uniform mottling found in the first group, larger irregular shadows apparently due to confluence of the individual foci. The third type had what is called diffuse fibrosis, but it is not clear whether the diagnosis of fibrosis was made on clinical or on radiological data, and the relevant illustration shows a great increase in the normal linear markings possibly attributable to opaque dust in the bronchial tubes. In Cooke's analyses of boiler scale and flue dust the former contained 3·4% and the latter 27·2% of iron oxide, which is opaque to X rays. The dust, of course, varies in composition according to the water put in the boilers and the fuel used to heat them.

A prima-facie case has been made out for the thesis that boiler-scalers and flue-cleaners develop a disabling fibrosis of the lungs, but it is not yet proved. In the two recorded deaths tuberculosis was a complicating factor, and in one at least it might have accounted for the fibrosis found. However the symptoms and X-ray appearances show that these mixed dusts are not altogether inert. Before long, we hope, investigators of this subject will not have such an easy time in "looking up the literature."

1. Cooke, W. E. *Brit. med. J.* 1930, ii, 816.
2. Williams, H. M. 19th ann. rep. Welsh National Memorial Association, 1931.
3. Dunner, L. *Brit. J. Radiol.* 1943, **16**, 287.

TRENDS IN CHILD MORTALITY

In his Milroy lectures to the Royal College of Physicians last week Dr. A. H. Gale discussed the changes of the past hundred years in the mortality and incidence of the principal infections causing death or disability in childhood. He took as his foundation Farr's celebrated supplement to the 35th annual report of the Registrar-General. This dealt with the vital statistics of England and Wales during the ten years 1861–70 but contained also much information about earlier years. At the time of Farr's review the annual number of deaths for children under 15 years of age averaged 227,000, out of a total of approximately 7¾ million children. In 1939 among 8¾ million children of the same age-group the deaths numbered only 46,400. Dr. Gale's object was to examine this spectacular fall with particular regard to the common infectious diseases of childhood.

The great reduction in mortality from scarlet fever is well known, but the data quoted are impressive enough to be reproduced—2201 deaths per million living under 15 in the period 1856–60 and a corresponding figure of 17 for 1939. Similar figures for whooping-cough are 1398 and 145 respectively; for measles 1185 and 35; and for diphtheria (and croup) 1379 and 231. But although the study of these infectious fevers is easier than for the less-well-defined groups of respiratory disorders designated as "bronchitis" and "pneumonia," more children have died of these two last since 1861 than of any other group of infections. In 1939, which was a year of remarkably low mortality in childhood, 17% of all deaths in children under 15 were ascribed either to bronchitis or to pneumonia. The trends for tuberculosis show an almost continuous decline for all age-groups in children from the decennium 1851–60 to the outbreak of the present war. There was a slight arrest in the decline among older children during the last war but since then the rate of diminution has been accelerated. The notable difference in the early years of the present war was the increase in deaths from tuberculous meningitis, and it is impossible to study exactly what was happening as regards this type of tuberculosis at the beginning of Dr. Gale's survey, because a hundred years ago it was classified with hydrocephalus. Another group considered in the lectures consisted of the epidemic diseases of the central nervous system, and although the recorded history of these—cerebrospinal fever, acute poliomyelitis and encephalitis lethargica—begins comparatively recently, the records are reasonably accurate and peaks can be shown for cerebrospinal fever, for example, in 1915, 1931 and 1940. Seeking for explanations of the causes of the great declines he had described the lecturer presented various studies of changes in social conditions. Although in general he accepted the conclusion that bad social conditions are enormously important in determining rates of mortality in childhood, he regarded the study of what particular conditions are most important as still in its infancy. Very little, he said, is known directly about the influence of social circumstances on sickness-rates.

Dr. Gale's survey is supplementary, so to speak, to the various studies of infant-mortality trends which have lately appeared. His extension to the older groups of childhood raises many points of interest. As a background to the study of social medicine in childhood such a survey is of value in indicating likely ways to reduce mortality and morbidity still further.

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A NEW VACCINE FOR THE ARMY

THE British Army authorities have decided [1] to change the well-tried TAB vaccine, which was heat-killed and preserved in carbol-saline, for a new preparation which is killed by 75% alcohol and preserved in 25% alcohol. As before, great importance is attached to the use of fully virulent strains,[2] and the vaccine contains the full complement of Vi antigen which is so important in producing a high level of protection. Several points about the new alcoholised vaccine should be kept in mind. Bacteria suspended in alcohol sediment more completely than in saline, and unless the bottle is thoroughly shaken the bacteria sit tight and the syringe may not withdraw the proper dose of organisms. The doses of the new vaccine are smaller than those previously used. For men 0·25 c.cm. is followed after at least a fortnight by 0·5 c.cm., while for women the doses are 0·2 c.cm. and 0·4 c.cm. Annual reinoculation with 0·25 c.cm. is recommended for both. There was doubt at one time about the ability of 25% alcohol to effect sterility if the vaccine became contaminated during use, but this fear has been proved groundless. The chief advantage of the new vaccine is that alcohol preserves the integrity of the Vi antigen, as Felix [3] has shown, and it also probably induces a superior antibody response. Both local and general reactions are less severe than with the old vaccine; Felix, Rainsford and Stokes,[4] and workers of the Emergency Public Health Laboratory Service,[5] point out that the average time lost through reaction by those receiving TABC vaccine is likely to be considerably less with an alcoholised than with a phenolised product. Even so, the new vaccine produces an initial stinging pain on injection and some people still get a local reaction and a slight rise of temperature. In future it may be possible to produce even more inoffensive TAB vaccines. The question of adding a representative of the *paratyphosum* C group of organisms was considered, but infections of this kind in the Army were so few that this procedure was not adopted. Meanwhile there are sound reasons for the resignation of TAB from the active list and for the seconding of TAB Alc. to take its place.

ALKALIS IN SULPHONAMIDE THERAPY

THE antibacterial activity of sulphonamides has been shown [6] to depend on their degree of ionisation. Therapeutic activity is exerted by the sulphonamide anion while the undissociated molecule is relatively inactive. It has also been shown that raising the pH of sulphonamide solutions to neutral or alkaline levels by increasing their degree of ionisation will increase their activity in proportion. Furthermore the greater potency of sulphadiazine and sulphathiazole as compared to sulphapyridine and sulphanilamide is explicable by their greater degree of ionisation at pH 7·4. These observations have now been applied to the local use of sulphonamides in wounds and burns [8] and the influence of alkalis on the solubility of these drugs has been studied with a view to preventing precipitation in the urinary tract. The solubility of sulphapyridine and sulphaguanidine is not much altered by making the urine alkaline within the physiological range, but Jenson and Fox [9] have found that sulphathiazole and sulphadiazine, like other weak acids, are made much more soluble by the addition of alkali. Their solubility in urine is minimal from pH 5·6 to 6·6, doubled or tripled at pH 7·5 and increased tenfold at pH 8·0. In a patient receiving a sulphonamide the glomerular filtrate contains a concentration of sulphonamide approximating to that in the blood and sharing a similar pH (7·4). As this filtrate progresses through the tubular part of the nephron, many constituents, especially water, are reabsorbed. This process leads to a rapid rise in the concentration of the sulphonamide in the urine and to a concurrent fall in pH to the normal acid levels (between 5·0 and 6·0) of voided urine. As a result, crystals may be deposited in the renal tract. A fluid intake sufficient to maintain a daily urinary output of at least 1500 c.cm. has been recognised as a valuable measure in the avoidance of crystalluria, whatever sulphonamide is being given. The observations of Jenson and Fox seem to provide a clear indication for the use of alkali as an adjuvant to sulphathiazole or sulphadiazine therapy, not only to eliminate the risk of crystalluria but to increase their therapeutic efficacy in the urinary tract. Large doses of alkali are required to neutralise the usual acidity of the urine and also that of the sulphonamide. Gilligan and her colleagues [10] recommend divided doses every four hours to maintain a relatively constant urinary pH throughout the day and night. The reaction of the urine should be tested with litmus paper and the alkali must be continued for twenty-four hours after the sulphonamide has been stopped. The daily amount of alkali recommended is gr. 240 of sodium bicarbonate, gr. 320 of sodium lactate or gr. 280 of sodium citrate. These large doses are said to be well tolerated and no alkalosis has been observed.

WOMEN STUDENTS IN THE LONDON SCHOOLS

A committee of seven members was appointed in February, 1943, by the senate of London University, to inquire whether it was desirable to provide better facilities for women medical students. In February of this year the committee reported to the senate, six of the seven members recommending that all the London medical schools should be open to men and women on terms of equal opportunity. The senate has approved the majority report of the committee and there is reason to think that the medical schools will fall into line. It is suggested, however, that the policy cannot be carried into full effect for some years, in view of practical difficulties including provision of new accommodation and facilities.

THE Medical Research Council have appointed Dr. B. S. PLATT director of the unit for research in human nutrition which they have set up. Temporary accommodation has been provided at the National Hospital for Nervous Diseases, Queen Square, London. Some part of the investigations undertaken by the unit will be directed towards nutrition problems in the tropics, and Dr. Platt will continue the work, for which he joined the council's staff in 1938, of coördinating a programme of nutritional investigations in the Colonies by arrangement between the Colonial Office and the council.

Colonel A. H. PROCTOR, DSO, IMS (retd), who has just relinquished his duties as dean of the British Postgraduate Medical School on the expiration of a five-year extension of the age limit, was the recipient on Feb. 18 of a presentation made by members of the governing body, the school council and the staff. The present took the form of a cheque, together with a copy of the works of Ambroise Paré, and the volume inscribed with contributors' names was handed to him as a token of esteem and affection. At an earlier date presentations had been made by the secretarial staff and by the technicians.

Dr. H. G. TURNEY, consulting physician to St. Thomas's Hospital, died in London on Feb. 26 at the age of 83.

1. *Army med. Dep. Bull.* January, 1944, p. 4.
2. Perry, H. M., Findlay, H. T. and Bensted, H. J. *J. R. Army med. Cps*, 1933, **60**, 241.
3. Felix, A. *Brit. med. J.* 1941, i, 391.
4. Felix, A., Rainsford, S. G. and Stokes, E. J. *Ibid*, 1941, i, 435.
5. *Bull. emerg. publ. Hlth Lab. Serv.* October, 1942, p. 4.
6. Fox, C. L. jun. and Rose, H. M. *Proc. Soc. exp. Biol. N.Y.* 1942, **50**, 142. Schmelkes, F. C., Wyss, O., Marks, H. C., Ludwig, B. J. and Strandskov, F. B. *Ibid*, p. 145.
7. See *Lancet*, 1942, ii, 648.
8. Fox, C. L. *Arch. Surg.* 1942, **45**, 754.
9. Jensen, O. J. and Fox, C. L. *J. Urol.* 1943, **49**, 334.
10. Gilligan, D. R., Garb, S., Wheeler, C. and Plummer, N. *J. Amer. med. Ass.* 1943, **122**, 1160.

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Reconstruction

THE WHITE PAPER REVIEWED

I. By a Clinical Teacher

First impressions are good. The white-paper has neither the vision, nor the breadth of outlook, nor the literary qualities of the Beveridge report;- but, considering the difficulties with which its authors have had to contend, and the way in which it has been bandied in draft between the Ministry, the medical profession, the three major political parties, and employers and trade unions, it has emerged much less emasculated than seemed possible. Perhaps a feeling of relief at finding the finished article less unsatisfactory than one feared may have something to do with my initial reaction of approval, but on more careful consideration another factor comes into play—namely, that decisions on many of the more controversial points are postponed. By adhering to an enunciation of general principles the Minister has, very astutely, succeeded in producing a memorandum with which it is difficult to disagree, leaving to a future date the problems on which it will be hardest to find agreement. Even so, however, the proposals go far to place our medical services on a rational basis and (what is even more important) a basis which allows for future expansion.

DISAPPOINTING FEATURES

I find the white-paper seriously open to criticism at three points. First it is extremely hard to assess its real significance because of the disjointed way in which the Government are producing their plan for postwar reconstruction. Until we know what are the recommendations of the Goodenough Committee on Medical Schools it is impossible to give any definite opinion as to how the new plan will affect the teaching hospitals; the means of incorporating dental treatment cannot be decided until the Teviot Committee has reported; the vital question of the powers to be exercised by local authorities is unanswerable until the Government give a ruling as to whether our methods of local government are to be overhauled; and the financial aspects of the scheme must remain largely in abeyance until the proposed scheme of social insurance is published. It is as if we had been presented with a few pieces of a jigsaw puzzle and told to complete the picture without the remaining parts. To some of us it is dangerously reminiscent of the chaotic state of affairs after the last war—those days which our politicians are so fond of telling us will never recur.

To many the Minister's proposals for the local and regional administration of the scheme will bring foreboding because of the powers they seem to grant to local authorities. While there will be general approval of the principle that regionalisation should be based on areas larger than existing county and county-borough councils, the conclusion that the Joint Authorities to be set up should consist entirely of representatives of county and county-borough councils, without direct representation of other interests such as the medical and nursing professions and medical schools, will be equally strongly deprecated. The decisions of such Joint Authorities will be subject to ministerial approval, and they will have to consult the Local Health Services Councils—but these are cumbersome procedures, and in practice it is doubtful to what extent an advisory council will be able to exercise much controlling influence over the Joint Authority. The democratic principle must not be carried to its logical conclusion; indeed it has always been the glory of English political institutions that they have never carried any one process to its logical conclusion, but have always been willing to compromise when necessary. Here, I should have thought, was one of those occasions for compromise, and the Joint Authority should include certain representatives of the interests primarily concerned in the successful development of a National Health Service. This is a question which will, of course, be of prime interest in those cases, such as London, where the Joint Authority will be the local authority itself.

At this stage the question may be asked, what concern of the clinical teacher is all this general criticism? My answer would be that it is those who are now my students, and those recently my students who will return from the Forces after the war without any experience of civilian practice, who will be primarily concerned in the working of the new scheme. It therefore behoves me, as a clinical teacher, to do all I can to ensure that the National Health Service awaiting these young men should be one that will offer them ample scope for developing their professional capabilities.

To turn now to the third disappointing feature of the scheme, we come to a part in which I am more intimately concerned; this is the lack of statesmanlike vision in coördinating our hospital and consultant services. The proposals, so far as they go, are sound, but they do not go far enough, and they are definitely inferior to the proposals of Medical Planning Research for two types of hospital—key hospitals and medical centres—so arranged that all the medical services in an area, apart from domiciliary practice, are unified into one coherent scheme. The white-paper says a great deal about coördinating all the medical services in given areas, but not enough direction or guidance is given as to how this is to be done. Progressive Joint Authorities, particularly those in areas including medical schools, may well produce a satisfactory plan, but elsewhere, I fear, clinics will remain scattered without that coördination and geographical centralisation that are essential for the success of any National Health Service—a coördination which would facilitate not only the intelligent coöperation of doctors but also the instruction of students.

As a clinical teacher I am also disturbed to find so little attention devoted to the vitally important question of the status and remuneration of the junior members of the medical and surgical staffs of our hospitals. Little enough is said concerning consultants, but there should be small difficulty in arranging for their status and remuneration to be safeguarded. What is entirely ignored is the position of their immediate juniors. Unless we ensure that members of the staff, corresponding to medical registrars in teaching hospitals, are given adequate salaries, adequate opportunities for research and postgraduate work in medical schools or hospitals other than their own, and reasonable grounds for expecting promotion, we shall never be able to persuade our more able graduates to adopt this particular branch of the profession. We shall never be able to ensure a sufficient flow of suitable candidates for the ranks of our consultants until we radically reform the present pernicious system whereby the registrar is paid a wholly inadequate salary, is delegated all the work in the hospital which his seniors find too dull to do themselves, and has every obstacle put in the way of his carrying out investigations or seeking fresh sources of knowledge outside his own hospital. It is to be hoped that this neglected section of the profession will at last be given its due when the new hospital service is inaugurated. So far as house-officers are concerned, I am not particularly worried. If they are remunerated on the current EMS scale, they have little to grumble about, and I cannot conceive of teaching hospitals ever being allowed to return to the bad old system of "sponging" on their house-officers by expecting them to do the major work of the hospital, paying them nothing, and doing as little as possible to provide them with ordinary social amenities.

EFFECT ON MEDICAL EDUCATION

Provided the scheme evolves on the right lines, how will it affect me as a clinical teacher? As a whole-time consultant, attached to my hospital, it will allow me to coördinate my duties as a clinician, teacher and clinical research-worker in such a way as has seldom been possible under the present system. My hospital will be my centre, and as my colleagues will spend much more of their time there than they have been in the habit of doing, we shall be able to concentrate on producing a unified curriculum which will give our students a much more satisfying training.

With all the medical services of the area centred on the teaching hospital we shall be able to introduce to our students in a logical manner all those multifarious aspects of medicine that they have hitherto encountered all too haphazardly. Infectious diseases, tuberculosis, mental diseases, maternity and child welfare will all fall into a unified curriculum which will result in the student

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entering practice well equipped to deal with the conditions he will find there—instead of finding it a bewilderingly different story from what he learned as a student. He will know something of the problems of the aged and the chronic sick; he will be acquainted with the facilities available for dealing with the crippled and mentally defective child; he will know something of the facilities available for the "rehabilitation" of his patients once they have passed to the stage of convalescence. These are the aspects of medicine which we teach at the moment but which we have found so much difficulty in demonstrating in actual practice.

The other great advantage that will accrue is that it will at last be possible to arrange for every student to spend at least three months in residence in hospital, an integral part of his training that has been sadly lacking in the majority of medical schools. Once we have a coördinated hospital service, served by consultants, there should be little difficulty in providing the requisite accommodation, and, as the members of the staff of the teaching hospital will provide the bulk of the consultant service in the associated hospitals, there will be no question of students being penalised by a period of segregation from adequate supervision.

From the point of view of domiciliary practice we shall also be in a much stronger position. When health centres have been established and have been integrated into the health service, we shall be able to modify our teaching so that it will be directly applicable to the conditions of practice. Once we know that the general practitioner will have the time and opportunity to devote adequate attention to individual patients, that at his health centre he will have good facilities for routine investigations such as clinical pathology and radiology, and that a full consultant service is available, without any thought of the financial status of his patient, at the neighbouring hospital, then teaching and practice will come to bear some semblance to each other.

On the subject of "refresher" courses for general practitioners I have hitherto been a complete sceptic. The man who has been in practice for ten years or more has developed a mental and professional outlook which render him entirely unsuitable for the type of instruction given at such courses. The process of disillusionment has been so complete that, having come to rely on his own, often bitterly gained, experience in practice, he has become more or less self-contained and—no matter how hard he tries—he finds it difficult to discard his subconscious feeling that where general practice is concerned he has little, if anything, to learn from the staff of a teaching hospital. Further, the physical and mental exhaustion of general practice has left him with little energy to take full advantage of an intensive course of instruction. All this, however, may now be changed. If our young doctors find that the passage from training to practice is a gradual process, if he finds that in practice he has all the facilities for investigation and following up his patients, and if he finds that postgraduate and "refresher" courses are available for him at regular intervals right from the time he enters general practice, then these courses will be of value to him.

Finally there arises the most intriguing, and at the same time the most difficult, problem of all. If, in the words of the white-paper, "the doctor must try to become the general adviser on all matters concerned with health (not less than with disease)," then a radical overhaul of our ideas on medical education is called for. As teachers, our present approach to medicine is still very much that of the pathologist. We fill our wards with "interesting cases"; we concentrate almost entirely on dis-ease and disordered function; the more abnormal the case the more time do we spend on demonstrating it. How ingrained this outlook is can be demonstrated by asking any registrar to provide a list of "teaching cases." What is the result? Either an impressive array of pathological humanity or an apologetic effusion as to how there are no "interesting cases" available at the moment. That is the outlook we have hammered into our students to such good effect that, once they are qualified, health, or slight deviations from it, are treated with the utmost contempt. Doctors trained in this tradition are obviously of little or no use in maintaining a state of health, and if the promotion of health and not the cure of disease is the prime aim of the doctor, then we as teachers will require to revise our ideas and methods very radically. In the first place we shall need to study health ourselves; either alone or in collaboration with our physiology colleagues, we shall need to carry out intensive investigations in order to understand normal "function"—not the function of the laboratory, but the function of *Homo sapiens*, a study which has been so brilliantly initiated by the workers at the Peckham Health Centre. We shall need to change the emphasis of our teaching so that, not overlooking the fact that the doctor must be able to diagnose disease, we shall impress upon our students the necessity for maintaining health and for detecting those slight deviations from the normal that indicate the early stage of disease, and for understanding all those factors, such as diet, housing, home conditions and climate, which are the framework upon which a healthy community is reared. The task is tremendous, but it must be tackled, and the institution of our new health service seems to be the long-awaited opportunity to put into practice those tenets which have received lip-service for so many years.

THE YOUNGER GENERATION

In some ways the clinical teacher bears a greater responsibility for the successful evolution of this new scheme than any other member of the community. The politicians are largely guided by what they believe to be the wishes of the electors; the citizen as patient is quite a different person from the citizen as elector, and provided he feels he is going to receive good medical attention, he is not going to worry unduly about the details of a medical service; the older generation of practitioners are mostly going to be guided by that innate conservatism that comes so naturally after years of general practice, and (provided they themselves or their practices are not going to be drastically upset) will accept, often under protest, the scheme as it finally emerges from the legislative machine. It is the student of today, and the newly qualified doctor who has gone direct into the Services, upon whon the ultimate success of the scheme depends; and their outlook is largely based upon their training and their teachers.

Today the student or newly qualified doctor is perplexed; he finds the world threatening to fall about his ears; catchwords are everywhere—positive health, social medicine, rehabilitation. His idealism is stirred and he feels that perhaps as a doctor he really will be able to play his part, however small, in helping the post-war world of which we are all dreaming. The promotion of health appeals to him as a more positive line of action than the curing or alleviation of the sick, and to his inexperienced mind "health" appears such a very definite concept that it never occurs to him that there is any difficulty in maintaining it or in detecting slight deviations from it. Thus he comes to us, pliable material, often of the purest texture, always with possibilities for development; and these lines of development depend very much upon us, his teachers. It is our teaching and our outlook that is impressed upon him in his pliable state and which is never erased.

There are times when we overlook or forget this, and fail to realise that it is not only our clinical teaching that is affecting our students, it is also our personality and our social outlook. If we damn the white-paper with faint praise, refer slightingly to "social medicine," or insinuate that health has really nothing to do with medicine, we shall be doing infinite harm. If, on the other hand, we are prepared to move with the times and set before our students an ideal of a National Health Service worthy of the highest traditions of our profession, we need have little fear as to the lines along which the service will develop.

If we can produce the doctors with the right outlook and the right training, the success of the Service is a foregone conclusion. The birth pangs may be severe; efficient compromise may be attained only with difficulty; but the final result will be satisfactory.

SCHOLARSHIPS FOR DOCTORS' SONS.—The governors of Cranleigh school are reserving at each of their entrance examinations a scholarship for the son of a member of the medical or dental professions. Examinations are to be held this year in March and June, and further particulars may be had from the headmaster, Cranleigh School, Surrey.

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Special Articles

MEDICINE AND THE LAW

Drug Manufacture and Monopoly

QUESTIONS in Parliament about the production of penicillin indicate public misgivings over the possibly restrictive effect of exclusive rights. The broad issues of the monopoly of manufacture have lately been set out from two sides. Last July Lord TRENT told the shareholders of BOOTS PURE DRUG CO. Ltd. that their company was now supplying important drugs in which, before the war, the Germans had established a monopoly "thanks to a patent system in this country which afforded them protection even though they did not manufacture here." Research workers, he said, were entitled to their due reward, but—as long as research, experiment and inventive genius were encouraged and financed by a reasonable system of royalties—it was contrary to the public interest that the state should permit, under its system of patents, any monopoly of manufacture. "The licence to manufacture should be granted to any firm that can provide satisfactory assurances of its competence to do so." Early in January IMPERIAL CHEMICAL INDUSTRIES Ltd. issued a pamphlet, with a preface by Lord MCGOWAN, which contended that the existing law is admirably suited to all concerned, whether inventors, manufacturers or members of the public, and that no amendment is needed. At the end of the month BOOTS Ltd. put out a reasoned rejoinder. Both sides in this courteously conducted controversy devote attention to technicalities, statutory and judicial. While members of the medical profession cherish its traditions of renouncing the commercial exploitation of a discovery likely to benefit mankind, the present discussion involves some study of the law.

The Patents Act allows the inventor a short-term monopoly of sixteen years. Under section 24 the Comptroller of Patents can, at the patentee's request, indorse the patent with the magic words "Licences of Right." Thereupon anyone can obtain a licence to work the patent on terms which, in default of agreement, are settled by the Comptroller. The Act stipulates that the settlement must endeavour to secure three objects: (1) the widest possible use of the invention consistent with the patentee deriving reasonable advantage; (2) conversely, the maximum advantage to the patentee consistent with the invention being worked by the licensee at a reasonable profit in the United Kingdom; (3) an equality of advantage among the several licensees, subject to account being taken of work done or money spent by any previous licensee in testing the commercial value and development of the invention in this country. This system of licensing under section 24 has, it is said, been of less value than might have been expected, possibly because it reserves the initiative to the patentee.

Section 27, dealing with the abuse of monopoly rights, is more important. It allows anyone interested, three years after the patent has veen sealed, to complain to the Comptroller of such abuses as the following: unreasonable failure to work the invention commercially or to meet the demand for it adequately and on reasonable terms; restrictions of the commercial working due to importation of the protected article from abroad; or hindrance to British trade and industry due to refusal to grant licences on reasonable terms or to insistence upon unfair conditions of working. Where any such abuse is established, the Comptroller can (among other things) order the patent to be indorsed "Licences of Right," the consequences then being the same as where the inventor takes action under section 24. Or, if there is no working on a commercial scale and if such working requires capital expenditure, he may order an exclusive licence to be granted to anyone able and willing to put up the money. In special circumstances he may even order the patent to be revoked. Section 27 contains the significant proviso that, in determining whether or no there has been an abuse of monopoly rights, "it shall be taken that patents for new inventions are granted not only to encourage invention but to secure that new inventions shall so far as possible be worked on a commercial scale in the United Kingdom without undue delay."

Finally there is section 38A, introduced in 1919. It relates only to inventions for the preparation or production of food or medicine—matters which the public and the medical profession would presumably incline to place in a special category. It is mandatory in its terms. Here, unless he sees good reason to the contrary, the Comptroller must grant to any applicant a licence to use the invention, and, in settling the terms and fixing the amount of royalty or other remuneration, he "shall have regard to the desirability of making the food or medicine available to the public at the lowest possible price consistent with giving to the inventor due reward for the research leading to the invention." In practice, it is said, the Comptroller is inclined to apply the same tests under section 38A as under section 27. Be that as it may, the Act nowhere authorises such a system of universal compulsory licensing as those reformers desire who protest that the law favours the suppression of inventions, as if patents were taken out or acquired not to work them but to prevent their being worked if the working will compete to the prejudice of existing plants and processes.

Arguing against amendment of the law, ICI Ltd. observe that a sixteen-year exclusive privilege is not unconditional nor long enough to exploit the public. They deny any suppression of patents in Britain. Grant of a patent must give the inventor something; unless encouraged, he may refrain from inventing or from publishing his invention. It must give the manufacturer something too; he invests capital in plant and marketing. If he cannot be sure of a commercial return, he will not manufacture; a royalty system is an inadequate incentive. Compulsory licensing, argue ICI Ltd., hits the small manufacturer; the big competitor can undersell him. Rarely is an invention so conspicuously attractive that it sells itself on sight. Only a small proportion of inventions which are patented will make money; the few successes have to pay for the many failures and for all the expense of past and present research and development. Compulsory licensing would institute a tortoise race, no manufacturer being anxious to be first in the field. Both inventor and manufacturer may even prefer the indefinite kind of monopoly obtained by secret working rather than disclose an invention which, if patented, will bring so small a reward. British patent law, in the view of the champions of the *status quo*, goes further than most codes in protecting the public against abuses of monopoly; certainly the United States (where, by the way, the big international plans of exclusive territorial exploitation are at this moment challenged) has no scheme of compulsory licensing; such a scheme is neither justified nor necessary unless the country is going to socialise under state control all industrial activity. Why should the inventor's property be singled out for invasion? Does anybody suggest interference with a popular author's copyright?

The answer by BOOTS Ltd. is that these arguments rather assert that the law is framed to avoid abuses than prove that abuses do not exist. Only six or seven applications to the Patent Office have succeeded under section 27. The procedure in the courts is slow and costly. An application by McKechnie Bros, Ltd., for instance, occupied ten days before the Comptroller and nine before the Court of Chancery. The German patentees, though not working a patent here, refused a licence to the applicants on the plea that a licensing agreement was being negotiated with another firm. In the end the agreement was held not to be *bona fide;* but, while the applicants were fighting a costly battle for 1½ years to establish their claim, the Germans were successfully obstructing it to their own advantage. The German firm, it is asserted, advised by legal experts in the laws of all countries, brought about a worldwide organisation protecting a potential monopoly of dyestuffs, chemicals, explosives, plastics, synthetic rubber and petrol, hampering research and development in all directions and obliging Parliament at the outbreak of war to improvise exceptional arrangements for initiating manufacture here to make up leeway. Unless we are careful, it is said, we shall be faced, after the war, with the old devices for eliminating competition, exchanging exclusive licences, and allocating exclusive areas for exploitation. Inventors, it is confidently stated, will not stop inventing because they are rewarded with

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royalties. Let manufacturing opportunity be broadened; what matter if selling prices are reduced? Even under compulsory licensing the original producer gets a useful start and can secure goodwill and reputation for his trade name.

Thus the argument goes to and fro while members of the public look to see how far their interest is cared for. Health and the cure of disease are everybody's concern. When the protected article consists of necessary food or medicine, a threat of restricted output or profiteering will challenge the public to choose between exploitation by private enterprise and the transfer of the exclusive rights to the state, the universities or the hospital. The statutory tests for dividing the reward between the patentee and the licensee are nicely balanced in the Patents Act. If, in weighing their respective shares, the public concentrates upon the words in section 38A about the desirability of making a medicine available at the lowest possible price, there can be no surprise. And they may remember that Professor Fleming, the discoverer of penicillin, will receive no reward from public funds (see p. 324), since the Government's policy is to support medical research work in progress, not to offer payment on the basis of results.

GERIATRICS: A SURVEY

THE Nuffield Foundation, with coöperation by the Ministry of Health and the Assistance Board, have undertaken a survey of the problems of ageing and the care of old people. The survey will cover the work now being done by public authorities and voluntary organisations, and the public and private resources available for old people in Great Britain, and will collate these with the provision made for them in other countries. It will review medical research on the causes and results of ageing and consider lines of useful action.

The members of the survey committee, under the chairmanship of Mr. B. SEEBOHM ROWNTREE, CH, are:

Miss ELLINOR BLACK, B SC ECON., lecturer in social science, Univ. Lpool; Mr. E. C. BLIGH, social welfare officer, LCC; Dr. A. D. BRIGGS, med. supt., Stobhill Hospital, Glasgow; Mrs. A. V. HILL, vice-chairman, Old People's Welfare Committee, Nat. Coun. Soc. Serv.; Mr. W. HYDE, chairman, Public Assistance Committee, Oxon; Dr. AUBREY LEWIS, director clin. research, Maudsley and Mill Hill; Mr. FRED MESSER, MP; Mr. F. D. STUART; Mr. ROGER WILSON, gen. sec., Friends War Relief Service; with Mr. HOWELL JAMES (Min. Health) and Mr. G. STUART KING (Assist. Board) as advisory members.

Questions of medical research will be considered by a special subcommittee consisting of Dr. A. Greig Anderson (Aberdeen), Dr. Briggs, Dr. Lewis, Mr. A. S. Parkes, SCD, FRS (Nat. Inst. Med. Res.), and Dr. J. H. Sheldon, (Wolverhampton). The secretary to both committees is Mrs. N. M. Windett, B SC ECON., at 73, Great Peter Street, London, S.W.1.

INFECTIOUS DISEASE IN ENGLAND AND WALES

WEEK ENDED FEB. 19

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 2063; whooping-cough, 1825; diphtheria, 689; paratyphoid, 3; typhoid, 6; measles (excluding rubella), 1620; pneumonia (primary or influenzal), 974; puerperal pyrexia, 167; cerebrospinal fever, 67; poliomyelitis, 8; polio-encephalitis, 0; encephalitis lethargica, 0; dysentery, 277; ophthalmia neonatorum, 88. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Feb. 16 was 1706. During the previous week the following cases were admitted: scarlet fever, 101; diphtheria, 33; measles, 53; whooping-cough, 57.

Deaths.—In 126 great towns there were no deaths from enteric fever, 1 (0) from measles, 1 (0) from scarlet fever, 9 (1) from whooping-cough, 11 (1) from diphtheria, 55 (13) from diarrhœa and enteritis under two years, and 38 (9) from influenza. The figures in parentheses are those for London itself.

There were 3 deaths from diphtheria at Darlington. Birmingham reported 5 fatal cases of diarrhœa. No great town had more than 3 deaths from influenza.

The number of stillbirths notified during the week was 226 (corresponding to a rate of 34 per thousand total births), including 32 in London.

In England Now

A Running Commentary by Peripatetic Correspondents

NOWADAYS only an expert can tell what the Public is thinking about. My expert friend tells me that the answer this week is "Not the white-paper." On the day of publication it evoked mild approval, qualified by mild fear that the doctors will wreck it and mild doubts whether relations with a national doctor will be quite the same. But it had no "build-up" like the Beveridge report, it is hard to understand, and there is nothing much for the layman to criticise. Among doctors I hear it described as a very ingenious document intended to buy off as many potential critics as possible, a masterly compromise, a trap, and a highly civilised piece of work. The last at least is true.

* * *

The Africa star which has been in the ascendancy for some weeks has now reached its zenith. In the streets of these southern Italian towns the ribbon twinkles brightly on the battle dress of nearly every British soldier. Indeed one now regards it as an essential part of the uniform and it has become conspicuous only by its absence. For most of us, unaccustomed to the scent of battle, "whose feet the paths of peace have trod," the star shines in solitary splendour. The old sweats, however, have had to find room for the newcomer in a more or less fiery constellation as old as the last war.

There are those who would abandon these visible tokens of service. They instance So-and-So, who spent a week-end in Algiers during the summer of '43 merely to collect some information for the War House before returning home by plane, but who nevertheless put up his Africa star. But the soldier will continue to cherish his medals as many in the professions do their degrees and diplomas. And in any case these ribbons serve a useful purpose. With a little practice they provide a means of summarising a man's life history. His decorations are as pathognomonic as the staining reactions of a leucocyte.

On the other hand, the wisdom of using clasps on the Africa star to differentiate between 8th Army and 1st Army is open to doubt. These emblems give official encouragement to a rivalry which has grown up not only between the soldiers of the respective armies but even between their families at home. Not that military operations are in the least affected: the British genius for differing while they band themselves together to do battle against the common enemy must be the despair of the systematic Teuton. It is the peace-time repercussions of this Eight *v.* First rivalry which seems to have been overlooked by those who are planning postwar England. An 8th Army bat confronted by a 1st Army body-line bowler will require the full panoply of cricket—and then some—if he is to preserve life and limb. The rival factions will be seen on north-country bowling greens settling the matter once and for all. In all the pubs of England patrons who have shed their inhibitions will turn to the dart-board as the obvious court of appeal to settle disputed points in military history. And in 1950, in the drawing-room at *Alamein*, Acacia Avenue, we shall hear Mrs. A explain: "My dear, I haven't spoken to Mrs. B since the fall of Tunis. You see her husband was in the Derbyshire Yeomanry. The tradesmen sometimes ask my maid why Mrs. B calls her house *Oued Zarga* . . ."

* * *

"Well, we have our 'Lady Doctor' here at last, and she has actually attended two of James' lectures, taking her seat with perfect composure. The young men have behaved extremely well, and she really appears likely to go on her way quite unmolested. She breakfasted here one morning with several of our students, and last evening we had a few medical friends to dinner, and she joined us in the evening. Her manners are quiet, and it is evident her motives for the pursuit of so strange a vocation are pure and good."—*Extract from a letter to Sir James Paget from his mother, dated Oct. 17, 1850.*

"Miss Elizabeth Blackwell had been admitted a student by the House Committee of May 1850. The result of this permission was reported to have been satisfactory."—*Entry in the Journal of the governors of St. Bartholomew's Hospital, dated July 8, 1851.*

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Bemused by the splendour of the promised future of our profession I fell asleep, and from I know not what subconcious strata arose these troubled fancies.

"I have a stomach-ache," said Mr. Obadiah Worthyman, laying his bowler hat on the chromium-plated table of the health centre. "*Not* on the table, please," observed a nurse with steely eyes, "everything is sterile here." "I have a stomach-ache, doctor," said Mr. Worthyman, stolidly ignoring the nurse. "Fill in this form in triplicate," replied Doctor No. 14. "Take your identity card, ration book, income-tax assessment, birth-certificate, demobilisation papers, pensions record, unemployment and health cards to the Local Health Controller, and get them stamped." Mr. Worthyman went out. "Afraid he'll have a little bother if he insists he has stomach-ache," Doctor No. 14 remarked to the nurse, who was taking a swab from the chromium-plated table where the bowler had rested. "You mean, it's not on the list in the Ministry of Health schedule of symptoms?" she asked. "Of course it isn't," said the doctor.

"I have a stomach-ache," said Mr. Worthyman to the Clerk to the Health Controller. "Room 64; third floor," he was told. "Have you your papers?" inquired a weedy-looking clerk in Room 64. "Yes, I have my papers," said Mr. Worthyman; "I also have a stomach-ache." "Wait on that bench," said the clerk. An hour later the clerk returned. "This form is not in order," he said sternly. "You can't have stomach-ache, it's not on the Ministry of Health schedule; apply for a copy, here's a form."

Mr. Worthyman took a bus to Whitehall. "I want to see the Minister of Health," he said to the uniformed door-keeper, "I've got a stomach-ache." "You mean you want rehabilitating? Step this way." Mr. Worthyman took off his bowler and followed along a maze of passages. "Wait here," said his guide. Mr. Worthyman was in no wise awestruck, and set out to explore the recesses of the Temple of Health. Entering a large door over which was inscribed "Disciplinary Court," he sat down and listened to the proceedings.

"CASE 4.—Doctor 52, National Health Centre 241. You are found guilty of the following charges: 1. That you did, on April 16 of this year, administer a drug which was not in accordance with official recommendation. 2. That you did, in contravention of the Ministry Order, communicate to the public press a letter attacking a local town councillor for his interest in the maintenance of slum property. 3. That you attended your health centre improperly clad on several occasions, omitting to wear the black coat and striped trousers prescribed by the Ministry. 4. That you did on several occasions assume towards patients a jocular demeanour out of keeping with the dignity of your profession. We have to inform you that you are dismissed the service."

"Serve him right," said Mr. Worthyman, as he went out to take his seat in the corridor. But he was restless, and wandered about till he came to another, still larger, room; here the atmosphere was so much less oppressive that Mr. Worthyman felt creeping over him a warm glow of sanctity, for here were being distributed the honours and promotions.

"To you, Dr. 73, we award a knighthood for your unexampled ingenuity in the invention of new forms for the public to fill up. To you, Dr. 143, we award the position of National Regional Controller-General, Coördinator and Director-in-Chief of Local Busybodies. We look to you with confidence to tighten up the whole organisation; at the request of the German Embassy you will be required to travel in Germany for twelve months to instruct the German nation in the elements of public organisation."

"Hear, hear," said Mr. Worthyman aloud. But he was shown out for this unseemly exhibition of emotion; much to his regret, for he had experienced so much vicarious pleasure in the proceedings that he had forgotten his stomach-ache. Encountering in the corridor an imposing figure whom he at once recognised as the Minister of Health, he addressed him thus: "Sir, I have a stomach-ache." The Minister stared at him glassily. "Oh, yes. Yes. Yes. As I said in the House, and will say again, a comprehensive service, coördinated, controlled, ..." But Mr. Worthyman suddenly began to fall, down, down, down, and I awoke with a bang.

Parliament

ON THE FLOOR OF THE HOUSE

MEDICUS MP

IN his review of the war and the international situation the Prime Minister spoke on a lower note than usual, as befits the trials before us. He spoke of the "diseases of defeat" overtaking the peoples of occupied Europe, not only shortage of food, epidemics, and cold, but also those diseases of the spirit of man out of which civil war is engendered. There is civil war in Greece and Yugo-Slavia, there are the terrible problems of Poland, the difficulties of Italy, the agony of France. UNRRA will have to be equipped with psychiatrists as well as medical officers to look after epidemics. Mr. Arthur Greenwood spoke also of China, that great theatre of war in the East towards which the pageant of events is moving; there, too, great medical problems will arise.

For the rest of the week much time has been spent on the Education Bill, which is progressing slowly, and the religious issues are not yet disposed of.

The reactions of the House to the white-paper on medical services have been generally favourable. Some Conservatives will want to prolong the day of private practice and of the voluntary hospital as long as possible. Some Socialists and Liberals will want to extend salaried group practice even more quickly. But it is recognised that the white-paper provides a flexible organisation which will allow for different rates of change in different areas, and it is realised that changes must inevitably spread over years. There is talk of being able to provide for a contributory pension scheme for those engaged in private practice as well as a superannuation plan for salaried doctors. These discussions of points of detail show that the House as a whole accepts the principle of the changes indicated. This favourable reception may hurry up the presentation of a detailed bill, though discussions with the profession and local authorities must spread over a considerable period.

Some confusion still seems to exist about the link-up of this white-paper with the Beveridge report. The medical services white-paper embodies the conclusions of a survey and of discussions with ministers going back for over two years, well before the Beveridge report was thought of. Sir William's assumption B. is still sometimes spoken of as if it were a scheme, instead of a terse assumption stating the necessity for a comprehensive and unified service but leaving its nature quite unspecified. But Beveridge is a convenient peg on which to hang arguments. One minister is credited with saying that "Beveridge is the kind of fellow who invites twenty people to dinner and expects you to find the food and arrange the table." But as the Ministry of Health began its consideration of a national health service before Beveridge began his work, the food is already provided. It only remains for the bill to be drafted and the table can be spread.

FROM THE PRESS GALLERY

A National Water System

On Feb. 24 Mr. T. LEVY asked the House of Commons to refuse a second reading to the Anglesey County Council Water Bill "on the ground that it is undesirable that further powers should be given to individual water undertakings until such a time as legislation has been passed dealing with the national water resources." Since Mr. Levy came to the House, as Mr. RHYS DAVIES later pointed out, he has metaphorically drunk water, talked water and almost walked on water, and he took advantage of Mr. Speaker's permission for a wide debate to move his amendment in a speech that touched on drainage, sewerage, our milk-supply, and swimming-baths.—In his reply Mr. WILLINK, Minister of Health, advised the House to let the bill go through as he proposed not only to introduce a rural water bill covering sewerage but to publish a white-paper before Easter or at any rate shortly afterwards. The Government was not content with our local or general arrangements for water, but he added, "let it not go out that our water-supplies in this country are such a disgrace as might be thought by some," for 95% of the people in the land have a piped supply, and our typhoid deaths are the lowest in the world.

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QUESTION TIME

Discovery of Penicillin

Sir WILLIAM DAVISON asked the Lord President of the Council whether he was aware that Professor Fleming had made no financial profit from his discovery of penicillin, the new drug which had saved the lives of thousands of our soldiers; and whether a grant would be made from public funds to the author of this discovery.—Mr. C. ATTLEE: I am aware of the circumstances, and also of the fact that others have played an important part in showing the full value of Professor Fleming's original observation and in developing it as a discovery capable of practical application. The question of financial awards for medical discoveries has been carefully examined on earlier occasions with the conclusion that any such system, even if desirable, could not be administered equitably in practice. The policy of the Government is to support medical research work in progress and not to offer payments on the basis of results.

Sir W. DAVISON: Is the Minister aware that the parliamentary secretary to the Ministry of Supply recently stated in this House that the discovery of penicillin was as vital to the Allies as the most secret weapon we were producing? Is it not a curious thing that we should give grants to people who produce lethal weapons, but refuse them to the inventors of a drug which has saved thousands of lives?—Mr. ATTLEE: I have given the line which has always been taken by the Government. It is difficult to attribute to one individual a result which may have come from the researches of many people.—Mr. D. L. LIPSON: Do the Government propose to increase their grants for medical research? No further reply was given.

Replying to a further question by Commander O. S. LOCKER-LAMPSON Mr. C. U. PEAT, parliamentary secretary to the Ministry of Supply, said that penicillin was not a proprietary article. It was at present being manufactured only under Government auspices and manufacture would be controlled so long as that is necessary in the national interest.—Commander LOCKER-LAMPSON: If the discoverer is not pensioned, as he should be, should not the hospital where the discovery was made benefit and not commercial interests?—Mr. PEAT: I do not think that is for me to answer.

Penicillin in Russia

Replying to a question Mr. R. K. LAW stated that an Anglo-American medical mission was now in Russia and that among the items of information being communicated to the Soviet authorities is the present state of research into the clinical uses of penicillin.

Dental Benefits and the National Health Service

Sir RALPH GLYN asked the Minister of Health whether he could make a statement regarding the position of contributors to friendly and other insurance societies under the proposals of his department as set out in the white-paper, since it contained no mention of the persons who had now the expectation of dental and other extended benefits.—Miss F. HORSBRUGH replied: The purpose of the new health service is, of course, to increase and not diminish the facilities now available and its aim is a complete service for all. But the white-paper states clearly that dentistry presents special difficulties and the Minister must await the advice of Lord Teviot's Committee before he can form an opinion how best and how soon these difficulties can be resolved.

Manufacture of Artificial Limbs

Mr. W. H. OLDFIELD asked the Minister of Pensions if he would state the number of amputation cases repatriated from Germany in October last, and the number who had now been satisfactorily fitted with artificial limbs.—Sir WALTER WOMERSLEY replied: Last October 407 amputation cases, including a few members of the American and Canadian Forces who were being repatriated to their own countries, were sent to the United Kingdom from Germany. Artificial limbs have been ordered for all British cases ready for the fitting of limbs, but I regret that precise figures of those completed are not available.—Mr. RHYS DAVIES: Were not some of these poor fellows provided with artificial limbs?—Sir W. WOMERSLEY: Yes, but not of anything like the quality that we desire our men to wear.

Mr. OLDFIELD: What was the time taken to deliver artificial limbs from dates of measurements in 1939 and in 1944; and would the Minister ensure that adequate labour and materials were available to prevent undue delays.—Sir W. WOMERSLEY: The time taken varies considerably according to the nature of the limb, but it is generally longer than before the war. The present position is causing me some concern and discussions have taken place with my contractors who are making serious efforts to improve the position. There is, however, some shortage of skilled labour and I am considering with the Minister of Labour and National Service what can be done to make available to those contractors additional skilled workers.

Mr. OLDFIELD asked the Minister if he would provide similar accommodation and facilities at limb-fitting centres in the provinces to those considered necessary at Roehampton, which were not available to the majority of amputation cases.—Sir W. WOMERSLEY: Roehampton, which is the headquarters of the Ministry's limb service, deals with rather more than a third of the total number of amputation cases and it follows that the accommodation there must be on a larger scale than in provincial limb-centres. Subject to this the service in the provinces is comparable with that at Roehampton.

Letters to the Editor

SULPHONAMIDE DERMATITIS

SIR,—Tate and Klorfajn have called attention in your columns (Jan. 8) to epidermal sensitisation, with eczema reaction, produced by local application of sulphonamides. Practitioners are no doubt hesitating to employ drugs which may give rise to such unfortunate reactions. It is therefore a relief to read Professor Colebrook's comments in your issue of Feb. 5. As topical applications in septic skin conditions the group which includes sulphapyridine, sulphathiazole and sulphadiazine has been fairly widely used in the last two or three years, and many physicians have been favourably impressed both by their efficacy where other measures have failed, and by their harmlessness. In the treatment of several hundred cases of impetigo only four cases of dermatitis have been seen at our clinics or in private practice, and these were in soldiers who had by inadvertence been allowed to sun-bathe with the ointment still present on the exposed parts. No cetyl trimethyl ammonium bromide had been used, as in Colebrook's burn cases; the ointment consisted of 5% sulphathiazole in ether (1) 25% Halden's emulsifying base ('HEB Simplex') in soft paraffin; or (2) an emulsified lanolin base containing sodium alginate with traces of oleic acid and calcium hydroxide.

If light sensitisation was common, why was not more seen? Did their doctors fail to report the cases? Did the patients themselves avoid us; or were they seen and the condition not recognised? To the last three questions the answer is probably No. For various reasons skin sepsis may prove more resistant to treatment under war conditions than in peace-time. Loss of working time is an important consideration, and as a rapid cure usually follows the application of low concentrations of the drugs it is unnecessary to ban their use unless the danger of sensitisation is relatively great. In the temperate climate of the British Isles this seems unlikely to be the case, if reasonable precautions are taken against exposure to the sun during and immediately after treatment.

Cambridge. C. H. WHITTLE.

SHALL BASSINI DIE?

SIR,—I have read with pleasure Mr. Holman's letter of Feb. 12, adding his support to the filigree method in bad herniæ. No doubt in other parts of the country other workers in this field are obtaining equally valuable and consistent results. But I cannot agree with Mr. Holman's observation that the two filigrees are only occasionally required: presumably by this is meant the omission of the superficial filigree. Both filigrees, superficial and deep, are essential to the proper reinforcement of the inguinal canal. The object of the deep filigree is to convert a feeble atrophic non-functioning conjoined tendon into a non-extensible fibrocicatricial plate, which provides an impenetrable barrier to McGavin's gap (the space lying between the lower border of the conjoined tendon and Poupart's ligament). As the deep filigree lies between the conjoined tendon and fascia transversalis, the latter structure is also included in the result-

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ing consolidation. In bad herniæ, the aponeurosis of the external oblique muscle is also stretched and attenuated, and the superficial filigree is equally necessary to reinforce this weak area. The transverse struts of the superficial filigree brace together the superior and inferior crura of the external abdominal ring, thus effectively replacing the intercolumnar fibres of the external oblique. Moreover, the superficial filigree not only strengthens the anterior wall of the inguinal canal, but, as it also extends laterally, it protects the potential weak area lying external to the internal abdominal ring. The end-result of the operation is that the anterior and posterior walls of the inguinal canal are converted into resilient fibrous-tissue plaques, which cannot stretch because of the embedded filigrees. The cord lies in its normal position between the two plaques.

I speak with feeling on this matter, because I believe the omission of the superficial filigree might lead to recurrences, and so bring this valuable contribution to the surgery of inguinal hernia into disrepute.

Bethnal Green Hospital. W. PICKUP GREENWOOD.

NURSERY SCHOOLS AND NURSERY CLASSES

SIR,—In view of the Education Bill the executive committee of the Medical Women's Federation wishes to draw attention to points connected with the provision of nursery schools and classes for children under the age of 5 years. From reports of doctors having personal experience of the care of young children in many different districts of England, Scotland and Wales, it has become evident that great importance attaches to the following considerations :—

1. It is generally agreed that children between the ages of 3 and 5 benefit from some form of community life, but serious doubt is felt as to the advisability of making extensive provision for children under the age of 3.
2. A nursery school forms a suitable environment for the majority of children in the 3–5 age-group provided (*a*) that it is an independent unit with proper safeguards for the health of the children; (*b*) that the responsible staff have had special-training and experience in the handling of these children both from the mental and physical aspects, and have also had a grounding in practical hygiene; and (*c*) that emphasis is laid on the fact that up to the age of 5 the main consideration is health of mind and body, and that to ensure adequate health supervision there must be the closest coöperation between the nursery school and the various health services—i.e., child-welfare centres, health visitors, school nurses and doctors.

The nursery school can satisfy these desiderata, but we would deprecate any scheme of nursery classes. In these it is very doubtful that the right emphasis can always be secured, the class being a subsidiary element in the whole primary school in which the main interest must of necessity be centred on education rather than on health.

JANET K. AITKEN,
Medical Women's Federation. President.

BETTER HÆMOGLOBINOMETRY

SIR,—I agree generally with the excellent summing up of the situation in your leading article of Feb. 19. It must be remembered, however, that quite a few people are constitutionally incapable of reaching with visual colorimetry even the modest accuracy of "within 10%" which you suggest is sufficient for clinical purposes. These and others interested should not assume from your article that photoelectric colorimeters are out of the question because of expense or supply difficulties. The galvanometer is not a serious difficulty; the one we use is still readily obtainable and costs only £4, and many clinical laboratories already possess a galvanometer for measuring skin temperature, or for use with a pH apparatus, which is not likely to be fully employed. The cost of our outfit is actually less than that of the visual type of colorimeter, such as is "found in every biochemical laboratory"; these instruments are in any case almost unobtainable at present.

We have just constructed in this department a balanced (two photocell) mains-driven version of the colorimeter which Miss Guthmann and I described recently (*J. sci. Instrum.* 1943, **20**, 145). The total cost, including the galvanometer, photocells, transformer, filters and glass cells, together with the mechanical arrangement for moving the photocell was £24. This sum includes £7 for the mechanic's time and £5 for the box made by a carpenter. There is very little delay in obtaining any of the component parts. I feel, therefore, that this apparatus does in fact live up to its title: "A simple inexpensive photoelectric hæmoglobinometer."

It will be obvious from these remarks and the original description that anyone with a moderate degree of constructional ability could build a satisfactory apparatus at a very modest cost. The great advantage of our form of colorimeter is that it possesses what one might term a natural density scale. Since this scale is dependent only on the inverse square law it is not affected by the accuracy of the construction, provided that the distance between lamp and photocell can be read off accurately. The reliability and accuracy of a good instrument combined with the absence of visual fatigue makes its use a pleasure.

Institute of Physiology, Glasgow University. GEORGE H. BELL.

USES OF BRONCHOSCOPY

SIR,—Your annotation of Feb. 12 states that, at a joint meeting of the sections of anæsthetics and laryngology of the Royal Society of Medicine, "it was fairly generally agreed that bronchoscopy was usually preferable to blind methods of aspiration." In our opinion the majority of the speakers stressed the fact that a very large number of patients who develop postoperative atelectasis recover of their own accord with breathing exercises, encouragement to cough, and postural drainage. The small number for whom tracheobronchial suction is considered necessary may have this procedure done quickly, simply, effectively and atraumatically in bed, after the simple manœuvre of blind nasal intubation with a Magill catheter. The more serious procedure of bronchoscopy is rarely necessary.

R. R. MACINTOSH.
Oxford. WILLIAM W. MUSHIN.

POVERTY AND CHILD BEARING

SIR,—Your leader of Feb. 19 repeats the popular cry that all the ills of life are the direct or indirect result of want of money. It is this line of thought which is the origin of the incessant demand of every class for a rise of wages. Poverty, it is true, is at the root of all ailments; but it is poverty of wisdom, not poverty of money.

You say "inability to buy adequate food . . . is a stark, inescapable fact." This is not true. A housewife cannot afford to buy white bread and tea, bacon and beef, pastry and sweets, cigarettes and cosmetics, all of which are considered in these days to be necessary "foods" for body or nerves! But I have lived in villages in England where a man and wife brought up regularly 4 to 8 children well upon a wage of 18*s*. per week. I have examined hundreds of mouths of black children in the West Indies and of Indian children in India and of Balkan children in Yugoslavia where "real" wages were far lower than in England and where children were well fed—but the parents had wisdom to know that rye bread or oat porridge or semolina kous-kous or maize polenta were always cheaper and better than white bread and tea; where vegetable stews and oil and onions were made more nutritious with lentils and peas and dahl; where skim-milk and cheese and rice and potatoes provided "adequate food" within the scanty limits of the earnings.

The Lancet should set an example of demanding greater riches of wisdom among our people rather than follow the easy path of deploring the lack of money.

Harley Street, W.1. JOSIAH OLDFIELD.

SULPHONAMIDE RESISTANCE

SIR,—I would like to endorse Dr. Colebrook's letter in your issue of Aug. 14 (p. 207). From clinical work in this country it appears that plain sulphonamide can produce strains of gonococci most resistant to sulphapyridine. About 50% of these strains are not resistant to sulphathiazole. It also appears from work here that a very high proportion of the failures to cure gonorrhœa by treatment with sulphapyridine is associated with high

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acetylation of the drug. Effective dosage may be so small, due to the high acetylation, that there is a risk of building up resistant strains in such cases.

A thorough investigation of cases failing to respond to sulpha drugs seems to be overdue. Although the general picture of the mechanism of the action of these drugs is becoming clearer, there is still much work to be done before the enormous variations in the absorption, acetylation and excretion of these drugs can be explained. Confusion exists because of the imperfections of the analytical methods used in the early estimation of these drugs. Some of the methods used gave very poor recoveries of the acetylated form.

E. S. HAWKINS,
Director.
Chemical Laboratory, Baghdad.

SULPHAMEZATHINE IN LOBAR PNEUMONIA

SIR,—I would like to support Dr. Melton in his statement that 'Sulphamezathine' is at least as effective as sulphapyridine in the treatment of lobar pneumonia. Since 1942 sulphamezathine has displaced sulphapyridine as the routine drug in lobar pneumonia at this hospital, chiefly because the minor toxic symptoms such as nausea, vomiting and cyanosis are infrequent. The nursing staff are strong supporters of the clinical observations, both as regards their patients and also themselves if they have previously taken other sulphonamides when ill. I personally use it as the routine sulphonamide in other infections than pneumococcal ones and have had success in streptococcal, meningococcal, and *B. coli* infections. I have also tried it in brucellosis and have had one success and one failure. It has failed in one case of Pfeiffer's bacillus meningitis. As a clinical example of its potency, there has been one cure of a case of pneumococcal meningitis, which is always a good testing ground for a sulphonamide drug.

My reason for writing this letter is to bring this drug to the notice of those in general practice as being probably the best all-round sulphonamide for general use at the present time, especially as it is seldom vomited and can be given six-hourly instead of four-hourly. In spite of experience with the six-hourly doses, I still prefer to give a slightly smaller dose than Dr. Melton uses four-hourly in the early stages, as I think I get better results.

City General Hospital, Leicester. A. P. M. PAGE.

Obituary

JOHN WILLIAM HENRY EYRE

MD DURH, D P H, F R S E

Prof. John Eyre, consulting bacteriologist to Guy's Hospital, died on Feb. 17 in his 75th year. He was one of the pioneers of bacteriology in England, and was responsible for systematising many of the laboratory procedures in use today. Educated privately and at Whitgift Grammar School he entered Guy's as a student in 1889 and qualified MRCS and MB Durh. in 1893. His first appointment at Guy's was as ophthalmic assistant and registrar in 1894, and it was during this time that he began to study bacteriology in earnest, under J. W. Washbourn. His two interests resulted in a series of outstanding papers in ophthalmological journals on tuberculosis of the conjunctiva and the bacteriology of the normal conjunctival sac. Thereafter he made bacteriology his career, and it 1899 left Guy's to become bacteriologist to Charing Cross Hospital. He was the first Ernest Hart memorial research scholar from 1900 to 1902, and in that year returned to Guy's as bacteriologist on Washbourn's death. During the next 18 years, while a reader in the University of London, he designed and developed at Guy's a laboratory department which was a model of its kind. "He was one of the best organisers I have known," writes a colleague. "He could have run a large store, or even a large industrial combine, with the same efficiency that he brought to his lab. I feel sure that he could have told you what the second or third typist was doing at any moment of the working day. Yet with this he was kindly and always willing to help." Shortly after the last war he was appointed to a chair of bacteriology in London, and by then he had played an active part in a remarkably high proportion of the advances of his time. He retired from the active staff of Guy's in 1934. Generations of Guy's men will remember him for the infectious enthusiasm which inspired his teaching; his tiny figure, his strong personality without conceit, and perhaps even his taste for the bizarre in cars, combined to make him a hospital tradition.

Van Dyk

Outside Guy's he was widely known for his *Elements of Bacteriological Technique*, a laboratory guide for students first published in 1902. In 1905 he joined the advisory board of the Royal Commission on Mediterranean Fever, and he spent the next summer in Malta as chairman of the commission's working party. He gave the Erasmus Wilson and Milroy lectures in 1908, and was Hunterian professor in 1911–12. During the last war he was bacteriologist to the Royal Air Force hospitals, and a member of the committees studying trench-fever and chemical warfare. In succession he presided over the Royal Microscopical Society, the Hunterian Society, and the Royal Institute of Public Health and Hygiene, and for many years he was adviser to the Fishmongers Company, a post which brought him into the public eye at the opening of oyster seasons, for he was responsible for the prevention of pollution of the national oyster beds. Apart from his work on the bacteriological examination of shell-fish, his contributions to the earlier investigations on brucella infections, the initial differentiation of strains of pneumococci and the nature of institutional dysentery are perhaps the most valuable, but there were few fields of bacteriology which he did not explore.

He leaves a widow, two sons, one serving in the RAF and the other in the Army, and a daughter.

EMILY WINIFRED DICKSON MARTIN

M D, M Ã O RUI, F R C S I

Winifred Dickson was born in 1866 at Dungannon, co. Tyrone, and educated at the Ladies' Collegiate, Belfast, and Harold House School, London. She lived with her parents, first at home and then in London, for her father the Rt. Hon. Thomas Dickson, PC, was MP for Dublin, until after nursing her mother for a year she decided with her father's encouragement to go in for medicine. The school of the College of Surgeons in Dublin had just been opened to women, and she entered in the autumn of 1887. She found to her surprise that she could pass examinations easily, and, anxious to obtain a university degree, she applied for permission to enrol at Trinity College. Although supported by the medical faculty she was unsuccessful owing to the opposition of the theologians. She therefore matriculated in the old Royal University of Ireland, and carrying on both courses together took her licence in 1891 and the MB with first-class honours two years later. In the same year she was elected the first woman fellow of the Royal College of Surgeons in Ireland. With a travelling scholarship she spent six months in Vienna, which she enjoyed, and in Berlin—where she thought her time rather wasted as many of the clinics refused to admit women. While abroad she applied for a resident post at the Rotunda, but the managers refused to appoint a woman.

On her return Dr. Dickson put up her plate first in St. Stephen's Green and then in Merrion Street, and was appointed gynæcologist to the Richmond, Whitworth and Hardwicke Hospitals, and assistant master to the Combe. In 1896 she took her doctorate in medicine and her mastership in obstetrics, both with honours, and was appointed an examiner in midwifery to the Royal College, but two years later she applied unsuccessfully for the chair in obstetrics there. Her interests were not confined to her specialty. She wrote to the BMA describing the position of women in the Irish colleges, and applying for admission to the association's membership then confined to men. She had obtained the signatures of all her teachers to a note saying that they had found no difficulty in teaching men and women together. She

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also spoke and wrote on such topics as the need for women as poor-law guardians and dress reform.

On her marriage in 1899 she decided that she could not continue to practise, but in 1915 with her husband on service and her children at school she came back, first as an assistant in Rainhill Mental Hospital, and then as a locum at Ellesmere, Salop, where in addition to the general practice she acted as local MOH, and visited the union and service convalescent hospitals. Later she bought the practice and took on a male assistant, but in 1919 an attack of bronchopneumonia forced her to give up. Thereafter medicine again took second place to the needs of her family, but she spent two years on practice in London, Siena, and Tunbridge Wells, and later for several years was a part-time clinical assistant in a South Wales mining community for whose womenfolk she had the greatest sympathy.

Although she hated the sea, at 71 Dr. Dickson Martin visited one of her sons in New Zealand. Rumours of war, before Munich, made her jump on the first boat as she did not want to be boxed up so far away. On her voyage home she visited her lifelong friend, Dr. Mary Griscom, whom she had first met in Vienna, and who became famous as a surgeon in Philadelphia, and later as surgeon and teacher throughout China and India. Twenty-five years after her first war-time locum at Rainhill, Dr. Dickson Martin was back again on the staff and she continued on full duty up to within two months of her death on Jan. 19.

A correspondent writes: "I only met Dr. Dickson in her old age, but there was a vigour and vitality about her and a directness of opinion and expression which was unusual and refreshing. With this strong personality went remarkable unselfishness, and it was characteristic that, knowing for several months that she had an incurable carcinoma, she made no mention of it to her family, and continued with her work."

EDWIN THOMAS MARTYN SMITH

MB BIRM; CAPTAIN RAMC

NEWS has been received of the death in Italy of Captain E. T. Martyn Smith at the age of 30. He was educated at Haileybury and graduated MB Birm. in the summer of 1939. After a house-appointment at the Birmingham General Hospital he joined the RAMC in the spring of 1940 and a year later was sent to the Middle East. He was captured at the fall of Tobruk in June, 1942, but at the time of the armistice last September he succeeded in escaping from his prison camp in the north of Italy. With two other officers he travelled South towards the British lines. While they were attempting to cross a peak on the last lap of their journey Captain Smith slipped and was killed. A friend writes: "Martyn Smith would never have claimed outstanding medical knowledge, but he was sound and practical and would have made a first-rate general practitioner, as we know him to have been an admirable officer. His intimates will remember him as the best friend they had —unchanging, sympathetic, charitable and reliable. These qualities made him popular, but it is because he was himself a good fellow that we shall not forget him."

HENRY J. CURTIS

MD LOND, FRCS

Mr. Henry Curtis, who died on Feb. 16 in London at the age of 78, was a many-sided surgeon, widely travelled and experienced as teacher and writer. Having qualified from University College Hospital, London, in 1891, he became surgical registrar there while reading for his FRCS, and later took charge of the bacteriological department. He was appointed to the surgical staff of two children's hospitals, but broke off to become resident surgeon to Bulawayo Hospital and director of the Pasteur Institute for Rhodesia. On his return he began his long connexion with the Metropolitan Hospital and the Seamen's Hospital Society. In 1907 he married Lady Stanley (Dorothy Tennant), widow of H. M. Stanley, the explorer. During the last war he was surgeon to the Enfield Military Hospital and the Brook Street Hospital for Facial Injuries. W. L.-B. writes: "Henry Curtis was a colleague of mine for nearly 20 years at the Metropolitan Hospital; he was a most conscientious surgeon who took meticulous care not only during the operation but throughout the whole course of the patient's illness. Though quite firm in his own opinion he was always anxious to discuss his cases with his medical colleagues, and welcomed their advice. After his marriage in 1907 to Lady Stanley, they lived in Whitehall Court, where she dispensed charming hospitality. As was fitting in the home of a distinguished artist the walls were decorated with admirable pictures of the French school, including some by Bastien-Lepage, under whom she had studied in Paris. Her well-known picture in the Tate Gallery 'His first offence' shows clearly the influence of Lepage on her work. In this congenial environment it was pleasant to see how a rather shy man expanded. It was a very happy marriage, and Curtis never seemed to recover from her death in 1926. He became somewhat lonely and on his retirement lived quietly in the Inner Temple."

THE LATE MAJOR EDEN

HAVING read in India the biographical notice of K. C. Eden in our issue of Nov. 20, K. S. writes: Perhaps the characteristic that stands out most clearly in retrospect is Eden's power of concentration coupled with an uncommon versatility. He was very far from being a bookworm and yet there was no more serious student in his year. His ability to concentrate was a byword—the most vivid memory of this being the occasion when as residents we were rehearsing the traditional Christmas play. Amidst Bedlam in the common-room, while awaiting his cue, he was found sitting in a corner deep in an article in a surgical journal. And yet he took a very full part in the play.

During a distinguished student career he found time to edit the hospital magazine, serve on the medical-school committee, preside over an important college society, play soccer for the hospital, and help to run a boys' club in Bermondsey. Many of the prizes went to him and he became FRCS twelve months after passing his MB. His development was all-round; he read voraciously and could talk well and with information on religion, politics and the theatre. He was well informed about music, taking singing lessons from a leading professional, and had a keen eye for art, with some talent of his own for drawing. With all this he did not despise dancing and devoted at least a fraction of his intellect to the study of good food and drink.

His capacity for enjoyment was therefore intense, he was a true and thoughtful friend, and in his own home a delightful host. The waste of all that wealth of intellectual gift and emotional development is sadly to the loss of neurosurgery, to the profession as a whole and most of all to those near to him.

NEUROSIS AND FAMILY LIFE.—Addressing the annual meeting of the Davidson Clinic, Edinburgh, on Feb. 24, Dr. Andrew Davidson, chief medical officer of the Department of Health for Scotland, spoke of the importance of the happy family life as a prime factor in the prevention of neurosis and delinquency. None of the adverse influences at work in war-time had more far-reaching effects than the disruption of family life; out of this came much of the present-day antisocial behaviour, and consequent ill health both physical and mental. About a third of those receiving National Health Insurance sick benefit suffered from conditions predominantly of psychological origin. It was desirable to educate the public in the principles and practice of mental health.

FOR THE DOCTORS' PROTECTION.—Ear, nose and throat surgeons commonly wear a mask or have a celluloid guard attached to their head-bands to protect them from infection when examining throats, especially in children. Plain spectacles are also sometimes worn for protection. Dr. H. Yarrow has devised a shield, consisting of a rectangular plate of glass 9 in. by 6 in. with the two lower corners cut away, attached by a universal joint to an extending arm mounted on a heavy base. The device resembles a familiar kind of reading lamp. Dr. Yarrow has found it very effective when swabbing the throat or examining either chest or throat. It is made by Messrs. Herbert Terry & Sons, Ltd., of Holborn Viaduct, E.C.1.

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Notes and News

University of Oxford

An election of two members of the board of the faculty of medicine will be held on Wednesday, May 31. Nominations, which must be signed by six members of the general medical electorate, will be received by the secretary of faculties at the University Registry up to 10 AM on Wednesday, May 10.

University of Cambridge

On Feb. 25 the following degrees were conferred:

M Chir.—B. N. Brooke.

MB, B Chir.—*R. C. Barclay, *Keith Chitty, *F. A. L. da Cunha.

* By proxy.

University of London

The title of professor emeritus has been conferred on Sir John Ledingham, FRS, on his retirement from the chair of bacteriology at the Lister Institute of Preventive Medicine.

The degree of DSc has been conferred on Dr. A. G. McConnell Weddell.

Research on the Potato

Efforts are being made to produce varieties of potato resistant to disease and suited to conditions in various parts of the Empire. It has been shown that the diverse qualities desired must be sought among potatoes indigenous to Central and South America, and a large collection of such types, wild and cultivated, has been formed at the School of Agriculture, Cambridge. Lord Nuffield and the trustees of the Nuffield Foundation have now authorised grants of about £9000 for capital expenditure on this research. The money will be devoted to housing of the collection and the work thereon.

Middlesex County Medical Society

At a meeting to be held at the Central Middlesex County Hospital, Park Royal, London, N.W.10, on Friday, March 10, at 3 PM, there will be a demonstration of cases and discussions on pneumonia, diabetic pregnancies, and the treatment of carcinoma of the prostate with stilbœstrol.

St. Mary's Hospitals, Manchester

On Tuesday, March 14, at 4.30 PM, at the Whitworth Street branch, Prof. F. Wood Jones, FRS, will deliver the nineteenth Lloyd Roberts lecture. He will speak on some curiosities of mammalian reproduction.

Ling Physical Education Association

A refresher course is being held in Bristol, on Saturday March 11, at the Red Maids' School, Westbury-on-Trym, when Miss M. Forrester-Brown, MS, will speak on rest and exercise in the school curriculum.

Medical Honours

The MBE has been awarded to Surgeon Lieutenant R. M. MacIntosh, RANR, for courage, endurance and devotion to duty, and the Military Cross to Captain H. M. Jones, MB, RAMC, in recognition of gallant and distinguished services in Italy.

The DSO has been awarded to Lieut.-Colonel Archibald Crerar, MC, MB ABERD., RAMC, and the MC to Captain J. J. Sumner, MD DURH.

On Oct. 4 Colonel CRERAR established a main dressing-station with two surgical units in Termoli. On the morning of Oct. 5 the enemy began to shell the town; this intensified and that night the town was attacked by enemy troops who actually penetrated into the area of the buildings occupied by the MDS. Crerar maintained efficient treatment of all casualties and evacuation of the wounded out of the town under most trying conditions. He repeatedly went into the streets under small-arms and mortar fire to superintend the collection of wounded and maintained touch with the advanced dressing-station in the railway area. He sent back all non-essential personnel retaining only those necessary for the task. He succeeded in maintaining surgical treatment of casualties and during the twenty-four hours evacuated 294 wounded and 251 on the next day. At one period street fighting was going on outside the MDS which was twice hit by shells. This officer by his coolness and determination saved many lives and was an inspiration to those serving under him and to the wounded.

On the morning of Dec. 20 some Japanese wounded, including an officer, were lying in a nullah in front of battalion HQ position. To reach the nullah, a stretch of open ground for about 50 yards, swept by light machine-gun fire, had to be crossed. Captain SUMNER, the battalion medical officer, volunteered to lead a stretcher-party to bring in the Japanese wounded. He was strongly advised not to undertake this hazardous task, but with complete disregard for his own safety he organised and led a stretcher-party across the open to the nullah. There he tended the Japanese wounded, experiencing great difficulty with the officer who resented capture and resisted violently. Having dressed the wounds, he brought them back as prisoners. Later in the same day the area in which the RAP was situated was subjected to mortar fire, but Sumner continued to tend the wounded with a cool efficiency.

Royal Society of Medicine

On Tuesday, March 7, at 2 PM, at the section of orthopædics, Prof. F. Wood Jones, FRS, will read a paper on the functional anatomy of the foot, and Major W. E. Tucker will describe his experiences as a prisoner of war in Germany. The section of pathology will meet on the same day at 4.30 PM, and at 5 PM there will be a general meeting of the fellows of the society. The clinical section will meet at 2.15 PM, on March 10, at the Middlesex Hospital, W.1.

NEW PLANS FOR NURSES.—We have been reminded that the new regulations (*Lancet*, Feb. 12, p. 233) requiring nurses, on qualifying, to serve for a year in one of the fields of special shortage will not affect their right to volunteer for immediate service with the Forces.

A proteolysed liver preparation for administration by mouth, obtained by the digestion of whole liver with papain, is issued by Evans Sons, Lescher and Webb Ltd. under the name of "Hepamino." Its use for the treatment of megalocytic anæmia is permitted by the Liver (Regulation of Use) Order, 1944.

Appointments

Colonial Service.—The following appointments are announced:

HULSE, BERNICE M. LMSSA: MO, British Honduras;
HOAKING, Mrs. M. H., MB: MOH, Trinidad;
BAIRD, D. A., MB EDIN.: MO, Nyasaland; and
GLEN-CAMPBELL, M. J., MB ABERD.: asst. MO at Kingston Public Hospital, Jamaica.

GREIG, D. S., MD ST. AND., MRCOG: resident obstetrician and gynæcologist at the St. Helier County Hospital, Carshalton.

HUGHES, J. A., MB NUI: examining factory surgeon for Cinderford, Glos.

KING, F. H., MD CAMB.: HM Inspector of Factories.

Births, Marriages and Deaths

BIRTHS

DOWDESWELL.—At Nairobi, Kenya, the wife of Dr. R. M. Dowdeswell—a son.

GAUSSEN.—On Feb. 27, the wife of Dr. H. S. Gaussen, of Exeter—a son.

GIBBENS.—On Feb. 25, at Sidmouth, the wife of Surgeon Lieut.-Commander G. H. Gibbens, RNVR—a daughter.

GLASSOW.—At Corbridge, Northumberland, the wife of Captain Frank Glassow, MB, RAMC—a daughter.

GUERRIER.—On Feb. 22, in London, Dr. Shelagh Guerrier (née Streatfeild), wife of Flying-Officer H. P. Guerrier, MB, RAFVR—a son.

JACKSON.—On Feb. 20, at Halifax, the wife of Captain J. M. Jackson, RAMC—a daughter.

KETTLEWELL.—On Feb. 26, at Cranleigh, the wife of Dr. H. B. D. Kettlewell—a son.

MACVINE.—On Feb. 24, in London, the wife of Mr. J. Sinclair MacVine, FRCSE—a daughter.

MARKILLIE.—On Feb. 21, in London, the wife of Captain Ronald Markillie, RAMC—a son.

MERRIMAN.—On Feb. 21, in London, the wife of Dr. Basil Merriman—a son.

PAKENHAM-WALSH.—On Feb. 20, the wife of Dr. R. Pakenham-Walsh, of Fenham Carr, Lancaster—a son.

PITTAR.—On Feb. 21, at Looe, the wife of Surgeon Lieut.-Commander C. A. Pittar, RNZNVR—a daughter.

REES.—On Feb. 22, at Croydon, the wife of Dr. T. P. Rees—a daughter.

WILLIAMS.—On Feb. 20, at Tenbury Wells, Worcs., the wife of Dr. J. E. Blundell Williams—a son.

MARRIAGES

BURNE—DAVIES.—On Feb. 21, at Crondall, John Christopher Burne, MRCS, lieutenant RAMC, to Winifred Margaret Davies.

GOODHART—MORGAN.—On Feb. 19, at St. Philip's Church, Kensington, John Gordon Goodhart, MRCS, surgeon lieutenant RNVR, to Margaret Mary Eileen Morgan.

GREENSTREET—STEWART.—On Feb. 19, at Northwood, Peter Greenstreet, MRCS, surgeon lieutenant RNVR, to Dorothy June Stewart, WRNS.

LAMBLEY—FRAMPTON.—On Feb. 19, at Chislehurst, Kent, Derek Gordon Lambley, MB, to Joan Daphne Russell Frampton.

MACFARLANE—CAVE.—On Feb. 19, at Beckenham, Henry Patrick Eskine Macfarlane, MRCS, surgeon-lieutenant RNVR, to Joan Evelyn Cave.

DEATHS

ROBINSON.—On Feb. 21, William Robinson, MD LEEDS, DPM, of Whitstable, Kent, late medical superintendent of City of London Mental Hospital, aged 55.

TURNEY.—On Feb. 26, in London, Horace George Turney, OBE, DM, M CH OXFD., FRCP, FRCS, aged 83.

WATKINSON.—On Feb. 26, Wilfred Watkinson, MB CAMB., FRCS, of Walton-on-Naze, formerly of Haydock, Lancs.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export.

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PSYCHOLOGICAL MEDICINE
CURRENT METHODS OF TREATMENT*

IAN SKOTTOWE, M D GLASG, D P M
PHYSICIAN, NERVOUS AND MENTAL DISEASES, ROYAL BUCKS HOSPITAL, AYLESBURY; MED. SUPT., COUNTY MENTAL HOSPITAL

TREATMENT, in the broad sense of the word, means doing something practical to help the patient. It is in this sense, of the practical management and handling of the patient and of the situation in which he finds himself rather than in the narrower sense of detailed description of specialised and limited procedures, that I propose to discuss this topic.

THE AIM: SOCIAL REHABILITATION

The abnormal ways of living which war has forced upon the community have emphasised, as few other events could have done, the intimate relationship between social conditions and mental health or ill health. More and more does it become clear that the essential criterion common to all forms and degrees of mental ill health, is the extent to which the individual persistently fails to adapt himself to the social medium in which he lives; this refers not only to the material social medium, but also to the conceptual and cultural standards of the group. From this fact, together with the fact that there is now a substantially greater number of patients per doctor, emerges the conclusion that the eventual aim of all treatment in psychological medicine is to restore the patient as a useful social unit, by methods which are as simple, rapid and practicable as possible. It is, in short, better to restore the patient quickly to a useful practical way of living in the community with his fellow men, even if he has occasional twinges of anxiety, depression or obsessional thinking, than it is to free him entirely of these subjective experiences if, in doing so, one has to keep him under treatment for perhaps four times as long a period, and if in the end one finds that he has been freed of his symptoms only at the expense of undue dependence upon the doctor or some other individual.

Treatment in psychological medicine should be conceived as unitary and not as a series of separated highly specialised procedures. Some of the latter are useful, but, with perhaps the solitary exception of malarial treatment of the GPI, there is no specificity about them: there is no one form of treatment which is exclusively beneficial to any one form of illness. Treatment, like the illnesses themselves, must be viewed as a whole scheme or pattern of activity, having as its eventual aim the social rehabilitation of the patient. Special methods must be integrated within that scheme and should be selected logically and rationally according to their relevance to ætiological factors which have been ascertained, and their known effectiveness in abating particular symptoms or phases of illness. The first step in treatment is therefore diagnosis, not only in the sense of labelling the case, but in the sense of obtaining an adequate biography of the patient in his social setting, of his constitution, of the experiences which he has undergone, of the effects of these experiences and of what he is trying to do with himself now, and under what handicaps. A decision can be reached as to how far one is dealing with inadequate constitutional material, how far with somatic, how far with personal psychological and how far with social factors; and disposal and details of treatment can be planned accordingly in these broad categories.

THE PSYCHIATRIC INTERVIEW

Treatment starts from the moment of introduction to the patient. In this connexion the importance of the correct technique of the initial psychiatric interview is great. It is a non-recurring opportunity to influence the patient, wittingly or unwittingly, for long-term good or ill. It may be considered in three stages: (*a*) the obtaining of preliminary data from the patient or a relative, but preferably from both; (*b*) examination proper which should always include a careful somatic, as well as a psychological, examination; (*c*) formulation of the nature of the illness to the patient and his relative, jointly or severally, according to what the findings may have been.

The patient's view of his illness is usually very different from the doctor's. What appears to the latter as an annoying hypochondria, or a frank delusion or an unfounded fear of cancer or insanity, or even as mere laziness and lack of effort is usually a real pressing and distressing burden to the patient. It is idle to pooh-pooh such notions or to show by one's attitude that one does not take the patient seriously or that one regards him as being obviously alienated and as some sort of "different person." It is just as bad to pander to fanciful whims and requests for some special investigation or treatment, such as X-ray or electrical treatment, of which the patient has probably read some highly coloured account in the lay press.

Most patients feel that they are misunderstood. What is needed is to convey to the patient the notion that the doctor is there to hear his story and above all to *help* him. In order to do this it is essential to get out the facts and to reach a reasonable decision on them both as to further investigation and as to the treatment to be adopted. This cannot be done in a hurry; it takes, on the average, about three-quarters of an hour; but it saves a lot of time in the long run to make a proper job of it the first time. Few psychiatric cases lend themselves to spot diagnosis; but even if the doctor sees, or thinks he can see, what the diagnosis is long before the interview is ended he must still make a thorough examination. Not only must it be thorough, but it must manifestly appear to be thorough. Nothing else will avoid serious mistakes and nothing else will convince the patient that he is in fact being taken seriously and that the future management of his case rests upon sound foundations. In the great majority of instances it will be possible at the conclusion of the initial interview to decide whether the case is predominantly a somatic disease with psychological accompaniments, or predominantly a psychological disturbance without somatic accompaniments, or with such accompaniments themselves resultant upon the psychological disturbances or otherwise. The false approach of trying to decide whether a case is functional or organic should be abandoned. Few cases are exclusively one or the other, many are both; and as a rule it is a question of deciding not "Is it this or is it that?" but "How much is it this and how much is it that and what is the relationship between the two?"

A decision on this point must be reached as soon as possible. Special investigations should be undertaken only if there are sound grounds for doing so, never simply for their own sake, or because the patient demands them. To yield to such tempting and imposing evasions results only in perpetuating faulty conception of his illness in the patient's mind; and sooner or later it will occur to the more intelligent patient that a doctor who subjects him for many weeks to expensive investigations, and at the end of it all can report only that there is no evidence of this or that, cannot be very sure of his ground, and is not doing much to make a constructive and helpful diagnosis or a reasonable plan of treatment. Extended investigation and so-called "observation" has been seriously overplayed in psychiatry. The categorisation of a case as "functional"—if one must adhere to ancient dualistic conceptions—should never rest exclusively upon the absence of organic signs; and a functional aspect of the illness should never be excluded merely because of their presence. It should be remembered that functional symptoms have a positive ætiology, and until it is found it is unwise so to designate any illness; and furthermore that an organically determined symptom—for instance sciatic pain—may be dealt with in a neurotic way. All along it is essential not only to treat any organic disease that may be present but also to treat, manage and cope with the patient as a person.

A simple but unequivocal formulation of the nature of the illness can be conveyed to the patient by pointing out that he is a person as well as a collection of organs, that his feelings and thoughts emerge from the way he is constituted and from the experiences which he has undergone, that they can be modified not only by changes in his organs but also by changes in his way of

* An address to the London Association of the Medical Women's Federation on Nov. 20.

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living; and that they can themselves produce bodily changes such as palpitation, clammy hands, tense muscles with a consequent sense of fatigue or breathlessness (remembering the diaphragm), uncomfortable abdominal sensations and so on; and furthermore that personal feelings and thoughts can perpetuate and utilise organic disabilities for the satisfaction of personal aims. In this way the patient can be persuaded that changes in, and sensations apparently located in, various organs do not necessarily imply disease of the organ in question; the presence or absence of the latter is decided more reliably by medical examination than by the patient's own interpretation of his symptoms.

He should be made to feel that his illness is not some mysterious and unique visitation but is in fact something well understood, of which numerous examples are seen in other patients. The therapeutic value of a factual explanation of the illness, of rational persuasion in respect of symptoms and of clear-headed decisiveness instead of woolly ramblings about further investigation, is very great indeed, and in fact it forms the foundation of the future psychological management of the case; so much so that in outpatient practice it is found that protracted and repeated psychotherapeutic interviews need not take place in most cases if the initial interview has been properly handled, subsequent interviews being concerned more with practical problems in the patient's way of living (reinforced by visits from a competent social worker) and with brief reassurances or explanations.

DISPOSAL

In perhaps a sixth of the cases seen in outpatient practice it will be obvious that the patient must be admitted to a mental hospital. The main indications for this are: actual or potential disorders of conduct; the manifest presence of a serious disorder such as schizophrenia; advanced affective disorders like fully established melancholia or mania; and serious organic psychoses with florid confusional delusional or hallucinatory episodes for which adequate treatment cannot be had elsewhere. A mental hospital should not be regarded as a last resort in disposal, but as a place which provides essential treatment for certain forms and degrees of illness. The decision whether or not to recommend it in the individual case can rest only on accurate diagnosis, and it should be remembered that a denial of mental hospital admission may also be a denial of the only plan of treatment that is likely to be effective. It is, for instance, almost an act of gross negligence to pat an early schizophrenic on the back, tell him he is suffering from a "nervous breakdown," give him a bottle of bromide and send him for a seaside holiday at the very phase of illness in which mental hospital treatment is likely to be most effective.

But about 80% of psychiatric cases do not require mental hospital treatment, and some would be made frankly worse by it. This large group is made up predominantly of mild affective disorders, usually depressions and anxiety states, and mild organic syndromes with irritability, fatigue, tearfulness and failure of sustained mental effort as their leading features. In addition there will be some obsessional states, some conversion hysterias and a fair number of constitutional anomalies such as high grade defect and psychopathic personality. These latter anomalies should always be suspected if there has been a poor school record, frequent changes of employment, absconscions from home, more than one illegitimate pregnancy, trouble with the police and repetition of petty crime, or the persistent spending of substantial sums of money with nothing to show for it.

A rough-and-ready help in diagnosis and consequently in disposal is the application of a quick verbal and a quick performance test. In practice, Burt's reading test and the Porteous mazes can be applied in about five minutes. Together with the history they will give a reasonably reliable clue to the development of the patient's native intelligence and to his scholastic attainment. In young people, if the two tests rate the patient at the same mental age, and if it is 12 years or less (i.e., 2 years below average adult) high-grade defect may be suspected and more extended examination of the intellectual status should be carried out. If the test scores show pronounced scatter (failure in some simple tests but success in more difficult ones) an emotional or toxic factor is probably of more immediate importance than the constitutional state. If there is a discrepancy of more than 2 years of mental age between verbal and non-verbal tests in favour of the latter, one should suspect the presence of a special disability especially if the patient be left-handed or left-eyed, and one begins to contemplate disposal in terms of the services of an educational psychologist; if the discrepancy is in favour of good verbal performance one may suspect either defectiveness or a psychopathy, and the question of disposal in terms of occupational selection and social service supervision begins to be more prominent.

I mention these slight degrees of constitutional anomalies because they are often masked by, and indeed may be the main causal factor in, many neurotic syndromes and behaviour problems, and because they are so easily overlooked if one does not happen to think of them. To attempt to treat a neurotic syndrome by, for example, exclusively psychotherapeutic means is a sheer waste of time if the main underlying factor is a constitutional anomaly of the defective or psychopathic type. Such illnesses can only be dealt with by careful investigation, readjustment and *continued* supervision of the patient's social circumstances, including domestic as well as occupational adjustment. This is an indispensable aspect of treatment not only in constitutional anomalies but in some 30–50% of all psychiatric cases. To be effective it requires a carefully set up organisation with wide social contacts, and a staff of properly trained psychiatric social workers. Rapid advances are being made in this way not only within the framework of voluntary hospital and local authority social services, but also on a wider and more ambitious scale by the Provisional National Council for Mental Health, which is among other things a kind of integrating machinery for psychiatric social service on a nation-wide scale.

Having filtered off the group of prospective mental hospital admissions and that of disabling though slight constitutional anomalies, there remains a large group of illness, mainly of affective or mild toxic exhaustive type; essentially recent illnesses in previously healthy people to whom something has happened; illnesses in which the accent is on environmental rather than constitutional factors, though the latter are still present. Many of these patients will have had previous attacks of a similar kind of illness or will be found to display personality traits which are associated with liability to such illness; but the main point is that at the somatic, the psychological or the social level there has been an impact with some disturbing and probably modifiable or remediable factor.

A small proportion of these will require inpatient treatment in a general hospital, or in a psychiatric ward or unit of such a hospital or in a neurosis centre. The main indications for such admission rest upon the need for applying special methods of treatment—for instance, lengthy narcosis, narco-analysis and shock treatment, which cannot or should not, in my view, be attempted under outpatient or domiciliary conditions. But it is also indicated in cases otherwise suitable for outpatient treatment where the social circumstances are so adverse as to stultify such treatment—for instance, in the case of homeless people living in lodgings or hostels, or elderly people living alone, not getting proper food and warmth and so on, or where the illness has emerged from some domestic crisis from which it is essential that the patient should have a break.

DOMICILIARY AND OUTPATIENT TREATMENT

There remains, however, a substantial majority of psychiatric patients who can be treated under domiciliary conditions with or without attendance at a psychiatric outpatient department.

The main methods of treatment are:

(*a*) To persuade the patient, relatives and employers to accept the facts of the illness for what they are and to adopt a rational attitude towards it.

(*b*) To prescribe a practical daily life: by deciding, for instance, whether the patient is to continue at work or not; if so, whether on full time or part-time, and with what occupational adjustments; or if he is to stop work, what he is to do: is he to be in bed or up, or up part of the day? To look into the possibilities of congenial

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remedial occupation at home. What are his hobbies? Is company to be encouraged or not? Who is there in the house with him, is he to get away to some other relatives for a time, or if in lodgings is he to go home? Advice should be given to relatives on elementary antisuicide precautions. The most likely time for such urges to appear is in the early mornings. Removal of opportunity is the main step.

(c) To attend to somatic functions. Is his diet adequate? What of his fluid intake? Exercise, bowels and sleep all require consideration. Are there any minor maladies—e.g., dental sepsis, sinusitis, or minor degrees of malnutrition which require correction? Vitamin additions, especially the whole B-complex, are often valuable.

(d) To relieve symptoms, such as anxiety with excessive visceral responsiveness, depression and tearfulness, insomnia. A sound prescription for this is tincture of opium, minims 12 or 15, with min. 7–10 of liquid extract of cascara, made up with chloroform water, taken well diluted three or even four times daily. It is effective; I have never seen it produce an addiction; and it is unpleasant to take and the patient is not likely to hoard it and take an overdose, as may easily happen with barbiturates, especially in tablet form.

(e) Psychiatric interviews, which should deal with practical problems in the patient's life. They should be short, frank, reassuring and externalising rather than introspectionist.

(f) To use the services of a social worker, who will assess the social situation objectively, see that treatment is properly carried out and that the patient gets a square deal in the numerous and irritating ramifications of such problems as allowances, insurance, security of future employment and so on.

A plan of treatment on these lines is effective in some 60% of minor psychiatric disorders. If they are not dealt with promptly and effectively in this way, some of them become worse and require hospital admission, many drift into chronicity and go to swell the ranks of those reproaches to outpatient practice, the weekly bromide-topers. Bromide is a much more dangerous drug than is commonly supposed, for it produces chronic intoxication with lethargy, irritability and confusion if continued indefinitely.

SPECIAL METHODS OF TREATMENT

Some of the more prominent special methods of treatment applicable to hospital inpatients may be briefly considered.

(a) *Continuous narcosis.*—This is indicated when emotional distress is intolerable, faulty ways of thinking are tending to become habitual, sleeplessness is severe and exhaustion is becoming manifest. It is contra-indicated by renal disease and acute respiratory infections. There are several methods of applying it, but barbitone by the mouth has proved most effective. Toxicity is controlled by insulin, glucose and fluids. Narcosis is maintained for 12–14 days. It is a rational treatment because it secures rest for the affected part—the mind—it induces a pleasant affective state, breaks a vicious circle, and renders the patient amenable to suggestion and persuasion. It is nowadays almost devoid of risk. In acute panic states, narcosis is best induced rapidly, in a matter of minutes, by intravenous barbiturates and thereafter continued by intramuscular or oral administration.

(b) *Narco-analysis.*—This may be used for diagnostic or therapeutic purposes or both. In essence it consists in inducing a dissociated, disinhibited state by the rapid means of intravenous injection of barbiturates like sodium amytal. It is useful for bringing to the surface relevant psychological material which the patient, wittingly or otherwise, will not produce when he is fully conscious; but its greatest advantage is in relieving the muscular tension or tremors or paralytic symptoms of a conversion hysteria of sudden onset, or for relieving a hysterical amnesia. It resembles, and is to some extent a substitute for, hypnosis, but it does not imply the personal rapport which hypnosis requires.

(c) *Shock therapy.*—This popular title is a misnomer: a state of shock should not be allowed to develop. It refers to: (1) repeated hypoglycæmic comas lasting 45–90 minutes induced by gradually increasing doses of insulin, and relieved on each occasion by glucose intravenously or by the nasal tube, some 40–60 comas constituting a course of treatment; (2) convulsions induced by analeptic drugs like leptazol or by passing an electric current across the skull (between 10 and 15 convulsions are induced with about a 3-day interval between each). There is nothing to choose between the effectiveness of the two convulsive methods and neither is more frightening nor more dangerous than the other if the technique is correct. Neither insulin comas nor induced convulsions are free from danger, and they have a definite mortality risk, although it is only one in many hundreds. Induced convulsions occasionally produce fractures and dislocations, not only of limbs but even of the vertebral column, though lasting paraplegia is extremely rare. Both forms of treatment are contra-indicated by the presence of tuberculosis and myocardial disease. Neither will cure schizophrenia although both will abate the florid symptoms like delusions, hallucinations and oddities of conduct; the fundamental hall-marks of the condition—affective flattening and disorder of the thinking process—remain.

Affective disorders of retarded depressive type, and stupors, do well with induced convulsions and in such illnesses the sooner they can be applied the better. Sometimes a preliminary continuous narcosis can be used with advantage to relieve distress. Patients with motor restlessness, loss of weight and toxic-exhaustive manifestations do better with insulin comas. The indiscriminate use of induced convulsions merely because it is easy to do and is sometimes dramatic is to be severely deprecated. The modus operandi of all these treatments is not precisely known. It is certainly connected with the carbohydrate-oxygen metabolism of the nervous system and possibly with endocrine-hypothalamic-autonomic functions. Inasmuch as some psychiatric illnesses sometimes show evidence of disturbance of these functions such treatments may sometimes be rational; but more often they are empirical.

(d) *Prefrontal leucotomy.*—This is another treatment that is liable to be recommended blindly or because all else has failed. Occasionally it succeeds in chronic cases that have failed to respond to induced convulsions. It consists in cutting parts of the white matter between the frontal cortex and the basal ganglia; and if it has a rational basis it would appear to be that by severing cortico-basal association fibres it breaks the supposed neurological substrate of the linkage between particular emotions and particular perceptual contents. Thus it may relieve the automatically reiterated depressive symptoms of the chronic involutional agitated depression. It has also been reported to relieve the gross behaviour disorders and noisiness of chronic psychotic epileptics and paraphrenics. There is insufficient evidence yet to justify its widespread application to any particular form of recent, acute psychiatric illness, but it has produced some excellent results in apparently very chronic cases, quite inexplicably, and also some disappointing failures. A good initial personality and helpful relatives are essential pre- and post-hoc influences respectively.

It does not impair intelligence, though it may diminish the sparkle and spontaneity and capacity for abstract, conceptual thinking of the patient. The mortality risk is small but definite and the operation should, of course, be undertaken only in the field of activity of a specialised neurosurgical team.

(e) *Psychotherapy.*—The various forms of psychotherapy, which can be grouped into two main divisions—the rational, persuasionist and the analytical—continue to be indispensable. It has been well said that the therapist matters more than the therapy, for the end-results of all forms are remarkably similar. There is little doubt that selection of method depends more on the personal proclivities of the patient and therapist respectively than on any scientific data. An interesting development is group-psychotherapy in which a series of about 12 explanatory lectures and seminars is given to a group of patients suffering from similar forms of illness—for instance, anxiety with effort syndrome—in which explanations and persuasion are likely to be of value.

(f) *Occupational therapy.*—In the fullest sense of the term, and not only in the restricted sense of handicrafts, occupation graduated, controlled and prescribed as carefully as one would prescribe a drug is essential at some stage in the treatment of most cases. War has embarrassed the development of the handicraft side, but has accentuated the value of occupational selection and guidance in the light of more realistic experimental psychological tests than have been hitherto considered valuable in the clinical field.

SUMMING UP

To sum up the present position, it can be said that the trend in prophylaxis, in treatment proper and in after-care is towards accentuation of the social factors in

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illness and towards their modification. Treatment is less sectarian than it was and aims to be rather a coherent and reasonable plan of management of a person who is sick and who cannot adapt himself to his social medium. The illness may be attacked at several levels, for example, the somatic level, the psychological level and the social level, simultaneously or successively as the case may be, and there have been substantial and effective recent advances in particular technical methods in these respects.

Treatment in psychological medicine requires a broad viewpoint and an attitude of receptiveness towards new facts; but a sound knowledge of general medicine and a sympathetic understanding of human weaknesses continue, as always, to be indispensable attributes in those who would essay it.

LIVER FUNCTION AFTER BURNS IN CHILDHOOD

CHANGES IN LÆVULOSE TOLERANCE

S. L. RAE, A.M.I.L.T. — A. W. WILKINSON, M.B. EDIN., F.R.C.S.E.; LIEUT., R.A.M.C.

Royal Hospital for Sick Children, Edinburgh

IN 1938 Wilson, Macgregor and Stewart reported a series of patients suffering from burns and scalds. In 14 of 16 fatal cases of severe or long-continued toxæmia in their series there was evidence of intense liver damage, so closely associated with acute toxæmia as to leave little doubt that the necrosis and toxæmia were produced by the same mechanism. They considered the liver lesion an indication of the presence of a non-bacterial toxin circulating in the blood during the first few days after injury.

Acute toxæmia was more common and more severe in infants and young children than in adults. The relationship between the extent of injury and the severity of toxæmia was less direct and constant than for secondary shock; there appeared to be an association between acute toxæmia and depth of injury, such as that produced by steam, boiling water or momentary exposure to flame; patients with deep injuries or very superficial injuries escaped more often. In some patients who survived, jaundice was believed to be evidence of liver damage from which recovery took place. The liver of a child who died accidentally on the 14th day after injury showed a zone of healthy cells surrounding centrilobular necrosis.

Among the possible causes of toxæmia considered was tannic acid, and it seemed desirable to find out whether the liver lesion developed with other forms of treatment. In 1938, with this end in view, Wilson started to use 10% silver nitrate instead of tannic acid in this hospital; at that time the undoubted life-saving properties of tanning in the stage of shock made it seem essential to use a coagulant. In over 200 patients since treated by this method no instance of typical acute toxæmia has been observed and liver necrosis has not been found in any fatal case. During this period there were a small number of cases of acute toxæmia (some of which were fatal) among patients with minor injuries treated with tannic acid jelly. Previously the majority of extensive and superficial injuries had been followed by acute toxæmia when tannic acid was used.

To obtain further evidence of the effects of different methods of treatment the liver function of 27 children aged twelve years or less suffering from burns and scalds has been studied by means of the lævulose-tolerance test.

The technique of the test has already been described (Thomson and Wilkinson 1940). The Pulfrich photometer, however, was not at our disposal. The Klett biocolorimeter was therefore substituted and standard solutions prepared accordingly. Four working standards—5, 10, 15 and 20 mg. per 100 c.cm.—were prepared from a stock 1% solution of pure lævulose, in saturated benzoic acid solution; 0·2 c.cm. samples of each of the dilute standards were used in the analysis and were treated exactly as the unknown. The standards were set at 15 mm. in the colorimeter.

One of three methods of local treatment of the burn was employed:

1. Coagulation with 2% gentian-violet followed by 10% silver nitrate.
2. Coagulation with a proprietary jelly containing 5% tannic acid and 1 part in 5000 of 'Merthiolate' in a watery base.
3. Dressings of a paste containing varying amounts of sulphacetamide in a eucerin base.

Except for 7 patients treated with silver nitrate, the injuries involved only 5% or less of the body surface. It had previously been found that the tannic acid jelly could not be safely employed on more extensive lesions owing to an unpredictable and often severe toxic disturbance which followed its use; this appeared in a higher proportion of cases than with tannic acid solutions. The sulphonamide paste was under trial and was therefore used only on small injuries. It was found unwise to carry out the test in the first 5 or 6 days after very extensive injuries owing to the necessity of a 12-hour fast before the test. Nitrous oxide-oxygen anæsthesia, supplemented by small quantities of ether, had been administered to *all* the patients during local treatment of the injury; the duration of the anæsthesia varied directly with the extent of the injury.

RESULTS OF TESTS

Table I groups the results according to the method of treatment.

The following criteria of a normal response to the ingestion of lævulose by children up to twelve years of age have been suggested (Thomson and Wilkinson 1940): 15 mg. lævulose per 100 c.cm. is the upper limit of normality; this peak should be reached ½ or 1 hour after ingestion of the lævulose; at 2 hours the blood-level of lævulose should have fallen substantially and should approach the fasting level (i.e., be less than 5 mg.). Further experience with the test has led to some modification and the present cases fall into four groups: (1) normal curves; (2) high normal curves; (3) high flat curves; and (4) abnormal curves (fig. 1).

High normal curves.—In 5 cases the peak lævulose level approximated closely to 15 mg. In 3 of these cases the levels fell steadily from a peak half an hour after ingestion; in the other 2 cases the half-hour specimen was deficient. In 3 cases (5, 15, 19) comparison

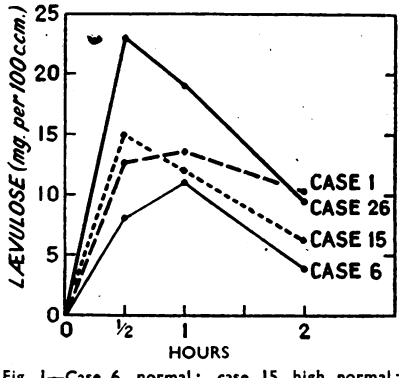

Fig. 1—Case 6, normal; case 15, high normal; case 1, high flat curve; case 26, abnormal.

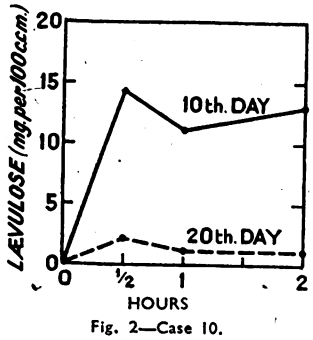

Fig. 2—Case 10.

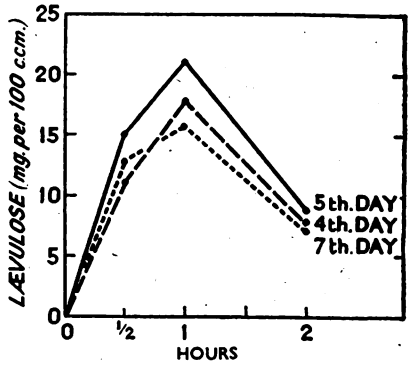

Fig. 3—Case 18.

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TABLE I—BLOOD LÆVULOSE AFTER VARIOUS METHODS OF TREATMENT

Case	Age (years)	Injury	Body surface (%)	After injury (days)	Blood lævulose (mg. %) ½ hr.	1 hr.	2 hr.
A—*Gentian-violet* 2%, *silver nitrate* 10% (12 *patients*)							
1	2	S	<5	2	12·3	10·1	5·9
				3	12·5	13·5	10·0
2	5¾	B	30	2	8·0	12·3	5·3
				4	9·3	12·4	5·0
3	9	S	35	3	12·3	10·0	8·4
				4	12·3	10·5	8·7
				13	8·4	10·5	9·1
4	5½	B	5	3	13·2	10·6	7·5
				5	11·8	13·2	6·4
5	5	B	20	4	..	15·3	7·0
				5	9·0	11·5	..
				6	8·3	10·3	6·0
6	1	B	10	4	7·8	11·0	4·0
				6	8·0	10·3	5·1
7	..	S	5	..	..	8·3	4·5
8	1½	S	5	10	10·3	7·8	6·5
9	4	S	30	10	10·0	10·0	3·0
10	7	B	45	10	14·0	11·0	13·0
				20	2·0	1·0	1·0
11	7 mos.	S	5	15	5·0	3·0	0
12	1½	S	10	22	6·0	7·0	2·0
B—*Sulphonamide paste* (7 *patients*)							
13	1	S	<5	2	10·5	9·0	8·4
14	2	B	5	3	10·7	8·5	6·7
15	3½	B	5	3	15·0	11·7	6·3
				5	10·2	8·9	5·4
16	11	S	5	3	12·3	16·2	7·5
				5	10·0	12·2	6·1
				9	9·9	12·1	6·4
17	1	S	5	4	..	14·0	7·5
18	3½	S	<5	4	10·8	17·7	7·8
				5	15·0	21·0	8·4
				7	12·3	15·6	7·0
19	2½	B	<5	5	14·0	11·0	6·0
				8	9·5	8·5	5·1
C—*Tannic acid, merthiolate jelly* (8 *patients*)							
20	2	S	<5	2	6·0	8·0	6·0
21	9	S	5	2	12·4	9·0	1·5
				4	15·8	12·2	8·6
				6	45·0	16·1	9·8
				8	17·4	14·2	9·3
22	..	S	5	3	15·3	10·5	10·5
				4	11·7	16·2	10·5
				5	13·1	12·3	10·0
				19	8·4	8·7	7·0
23	9 mos.	S	5	3	16·1	14·0	7·0
				4	..	17·0	11·0
				6	8·0	10·0	7·6
24	6½	S	5	4	14·0	11·7	7·0
25	3½	S	<5	4	8·0	10·5	9·5
26	1	S	5	4	23·3	18·3	8·9
				6	26·3	24·7	9·5
				15	13·4	15·0	11·4
27	7	S	<5	5	11·7	16·2	7·9
				6	13·1	16·1	8·1
				15	9·5	13·4	8·7

S = scalds, B = burns

with later tests, the results of which were within normal limits, showed that function had been slightly impaired. This suggests that 15 mg. per 100 c.cm. is probably too high an upper limit of normality since the extent of injury in these cases was, with one exception (case 5, 20%), 5% or less of the body surface.

High flat curves were found in 4 cases; in this type of curve there is no fall at 2 hours indicating delay in removal of lævulose from the blood-stream. In case 1 the extent of injury was very small and function was more impaired on the 3rd day than on the 2nd; unfortunately further tests were not done. By contrast, in case 10 (fig. 2) the injury was the most extensive in the series (45%) and, had the test been carried out earlier than the 10th day, a more severe disturbance might have been found. A further test 10 days later (20 days after injury) showed complete restoration of function. The remaining high flat curves occurred in association with other evidence of abnormal function (cases 22, 26). As yet it is not clear how much significance can be attached to the elevation of the 2-hour lævulose level, but it seems reasonable to conclude that values above 10 mg. per 100 c.cm. must be viewed with suspicion.

Abnormal curves with peak levels significantly above 15 mg. were found in 7 cases and call for consideration, since all were in association with injuries of 5% or less of the skin surface.

Two of the patients (cases 16 and 18) were treated with sulphacetamide paste; in case 16 there was slight impairment on the 3rd day which later passed off, in case 18 in association with a smaller injury in a younger child, considerable impairment was found on the 4th day and increased on the 5th day but declined on the 7th day (fig. 3).

The remaining 5 cases were treated with tannic acid jelly. In 2 cases impairment of function was found on the 3rd day and became more pronounced on the 4th and 5th days; in one case the disturbance lasted until the 15th day. In case 21 the injury involved half the head, face and neck, and one forearm; the head, face and neck were coagulated with silver nitrate, the forearm was treated with jelly, no sulphonamide drug being given by mouth; liver function was disturbed on the 4th day, a very high lævulose level was noted on the 6th day and function was still abnormal on the 8th day. This disturbance was attributed to the use of the tannic acid jelly.

Time relationship.—Impairment of function was found between the 3rd and 6th days, and was slightly more common on the 5th and 6th than on the 3rd and 4th days. After the impaired phase, in 10 cases there was evidence of improvement in subsequent tests. In 5 cases function became further impaired before improvement followed. The time taken for recovery appeared to be closely related to the degree of impairment of function.

METHOD OF TREATMENT IN RELATION TO LIVER FUNCTION

Table II shows the relative incidence of liver disturbance with the three different methods of local treatment.

TABLE II—LIVER DISTURBANCE IN RELATION TO TREATMENT

Method	Cases	Type of lævulose curve: Normal	High normal	High flat	Abnormal	Average extent of burn (%)
Gentian-violet, silver nitrate ..	12	9	1	2	..	18
Sulphacetamide paste	7	2	3	..	2	5
Tannic acid jelly ..	8	2	1	..	5	5

It is evident that liver damage was most common and severe with tannic acid jelly and least common and severe with silver nitrate, while sulphacetamide paste occupied an intermediate position. It must be remembered that the extent of injury was 5% or less in all the cases treated with paste or jelly, whereas in 7 of the 12 cases treated with silver nitrate the extent was 10% or more.

It is possible that in case 10 had testing been carried out earlier than the 10th day more severe impairment would have been found. Two patients (cases 17 and 18) treated with sulphacetamide paste developed a form of toxæmia on the 3rd to 5th days manifested by restlessness, cyanosis and elevation of temperature, and pulse- and respiration-rates, similar to, but not identical with, the acute toxæmia associated with the use of tannic acid; there was no clinical evidence of liver damage or of infection in either case, but in case 18 there was considerable lævulose intolerance on the 4th and 5th days, with some improvement on the 7th. The injury

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involved the whole of one forearm and a small area on the left cheek and forehead of a child aged fifteen months.

There is no close association between liver damage and the site or nature of the injury.

DISCUSSION

Impairment of liver function was found most often after the use of a jelly containing tannic acid and merthiolate. This agrees with clinical experience. We do not suggest that the tannic acid was solely to blame, since the merthiolate probably also played a part. Typical centrilobular necrosis of the liver has been found, however, in fatal cases of acute toxæmia after the use of this jelly, indicating that tannic acid may be the important factor.

In a large series of children treated with silver nitrate there has been no case of typical acute toxæmia, as seen after tannic acid treatment. There have been disturbances which were clinically somewhat similar, but in none of those who died was there any sign of centrilobular necrosis of the liver. In the present series some evidence of intolerance to lævulose was found after the use of silver nitrate and it may well be that liver function is disturbed by thermal injuries, apart altogether from absorption of tannic acid or other substances.

Wilson (1941) found that while injections of tannic acid were toxic to animals, silver nitrate in similar large quantities produced no such toxic effects. Argyria has not been reported after the local use of silver nitrate for burns, and it would appear that there is some local chemical factor which governs absorption from the coagulum.

Wells et al. (1942) produced centrilobular liver necrosis in rats by injecting solutions of tannic acid. Cameron et al. (1943) produced the characteristic liver lesion by treating burnt areas with tannic acid solutions. The degree of liver damage was related to the extent of injury and probably also to its depth, since in goats, where the lesion corresponded roughly to a deep human burn, liver damage was less severe than in rabbits, where the injury was more superficial.

Liver damage appears later in man than in animals, perhaps because associated vascular disturbances result in delayed absorption. Application of tannic acid in the form of a jelly may cause greater absorption because the tan remains wet. It has long been known that acute toxæmia may follow the wetting of a dry tannic acid coagulum. In the light of the work of Cameron et al. (1943) this effect is probably due to an increased rate of absorption of tannic acid after wetting, rather than to liberation of a toxin derived from burnt tissue and rendered inactive by tanning and drying as was formerly believed.

Barnes and Rossiter (1943) obtained results similar to those of Cameron. Clark and Rossiter (1943) found that liver function, judged by galactose tolerance, was impaired more readily by subcutaneous than by intravenous injection of tannic acid, and attributed this to long-continued absorption. Allen and Koch (1942), who have not used tannic acid, have not seen the characteristic liver changes in fatal cases of burns.

It has been shown that liver function may be impaired by sulphonamide drugs given over a long period (Thomson and Wilkinson 1940); but little is yet known about their systemic effects.

Hooker and Lam (1941) found that absorption of sulphanilamide from raw burned surfaces was rapid. Gordon and Bowers (1942) reported cyanosis, mental confusion and a peak blood sulphonamide concentration of 59 mg. per 100 c.cm. after powdering with sulphanilamide, on 3 successive days, a burn involving only 22% of the body surface. Hodgson and Robinson (1942), studying the absorption of sulphanilamide from various types of wounds, noted toxic symptoms in about half the patients at blood-levels of between 4·6 and 22 mg. Debenham (1943) has reported 2 cases of burns treated with sulphanilamide powder, exhibiting cyanosis, dyspnœa, tachycardia, restlessness and later unconsciousness.

While no evidence of gross liver damage was obtained in the present series of injuries of small extent treated with sulphacetamide paste, some patients showed signs of disturbance of liver function, and caution is needed in the local use of the sulphonamide drugs on injuries of more than 5% of the body surface.

CONCLUSIONS

Liver function has been tested after the treatment of burns with silver nitrate, with a tannic acid jelly, and with sulphacetamide. Disturbance of liver function was greatest with tannic acid and least with silver nitrate.

There is now sufficient evidence, both clinical and experimental, to justify disuse of tannic acid as a local application for burns.

Coagulation treatment nevertheless has many advantages and may be life-saving in the early stages of very extensive superficial burns. From the point of view of toxic absorption, silver nitrate is probably a safe coagulant.

Sulphonamide drugs may be rapidly absorbed from the surface of superficial burns, leading to toxic blood concentrations and sometimes liver damage. Their use on large burns therefore requires caution.

We are indebted to the surgeons of the hospital for permission to test their patients, and to Prof. W. C. Wilson and Dr. C. P. Stewart for much helpful advice and encouragement.

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AGRANULOCYTOSIS AND APLASTIC ANÆMIA AFTER ARSPHENAMINES

REPORT OF SIX CASES

JAMES W. FERGUSON, M B GLASG, M R C P E, F R F P S

ASSISTANT PHYSICIAN, OUTPATIENT DEPARTMENT, GLASGOW ROYAL INFIRMARY; PHYSICIAN, EMS

SINCE the introduction of arsphenamine in 1910 and neoarsphenamine in 1911 in the treatment of syphilis, toxic effects on the hæmopoietic system have been reported. Rumpel (1910) and Leede (1911) described hæmorrhagic phenomena but it was not realised till some years later, when Labbé and Langlois (1919) drew attention to the condition, that these hæmorrhagic phenomena were due to the arsphenamine. Farley (1930) collected 39 published cases of depressed bone-marrow function and added 7 of his own, 3 of which showed agranulocytosis and 2 aplasia of all elements of the bone-marrow. McCarthy and Wilson (1932) reviewed 79 reported cases of all types of blood dyscrasia following arsphenamine. Since then, reports of similar cases have appeared from time to time, but considering the widespread use of arsenicals in the treatment of syphilis it must still be considered a rare complication. After 878,040 arsenical injections in the US Navy in 1938 only 3 cases developed abnormalities of the hæmopoietic system—2 mild and 1 fatal—an incidence of about 1 per 40,000 injections. Between 1925 and 1938 in the US Navy 1,244,537 injections have been given with only 24 resultant blood dyscrasias, an incidence roughly of 1 in 50,000 (Stephenson and Chambers 1940). A remarkable feature is the absence of reports of cases of this kind in this country. To my knowledge, only 1 case of agranulocytosis (McGibbon and Glyn-Hughes 1943) and 1 of aplastic anæmia following the use of arsenic (Imrie 1935) have so far been reported.

The following 6 cases of blood dyscrasias after treatment with neoarsphenamine were admitted to an EMS hospital and came under my care and observation within a year.

CASE-RECORDS

CASE 1.—A soldier, aged 24, was admitted to hospital on July 15, 1941. On June 9 he had been found to have a primary chancre, confirmed by dark-ground illumination. Between June 10 and July 15 he had been given four arsenical injections (1·35 g. 'Neo-kharsivan' and 0·45 g. 'Sulphostab') and six injections of bismuth ('Bismustab' 0·8 g. and 'Neo-cardyl' 3 c.cm.). After his third arsenical injection he

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had a febrile reaction with headache and vomiting lasting 2–3 days. After the fourth injection another febrile reaction occurred, this time 4 hours after the injection and accompanied by a generalised erythema. On July 6 he complained of pain in the gums and a smear was found to contain Vincent's organisms. Next day his throat became sore and tonsils were seen to be enlarged and inflamed with follicular pustulation. Temperature 102° F. The condition failed to respond to treatment (local measures, sulphanilamide 1 g. t.i.d. for 2 days, 'Novarsenobillon' 0·3 g. twice intravenously and diphtheria antitoxin 10,000 units intramuscularly), and eventually the throat became covered by a dirty white membrane. On July 15 blood examination (see table) revealed an agranulocytosis.

He was an emaciated young man, lethargic and toxic looking, with bluish lips and finger nails. His face was pale but mucous membranes of good colour. The tongue was dry with a thick white fur. There was an extensive whitish-grey necrotic area involving the tonsils, fauces and soft palate. The cervical glands were slightly enlarged but other lymph-glands were not palpable. There was no rash or hæmorrhages. Temperature 100·4° F.; pulse-rate 100 per min. In spite of intensive treatment with 'Pentnucleotide' (40 c.cm. daily) and two blood-transfusions there was no improvement in the blood-picture and his general condition deteriorated. On July 17 he developed a bronchopneumonia and died next day.

BLOOD AND BONE-MARROW FINDINGS

Findings in—	Case 1	2	3	4	5	6
BLOOD						
Red cells, mils. per c.mm.	3·9	4·5	4·18	4·32	3·5	4·1
Hæmoglobin, % Haldane	80	90	84	88	66	72
White cells per c.mm.	2800	3400	2800	3500	2900	1200
Polymorphs (%)	0·5	0	0	0	1·0	4·0
Eosinophils (%)	1·5	0	0	0·3	3·0	1·0
Basophils (%)	0	0	0	1·0	2·0	0·5
Lymphocytes (%)	91·0	54·0	60·0	15·7	78·0	85·0
Monocytes (%)	7·0	46·0	40·0	83·0	16·0	9·5
Platelets per c.mm.	norm.	norm.	290,000	norm.	norm.	33,600
BONE-MARROW CELLS %						
Neutrophil polymorphs.		0	0·3	0·5	0	
Do. metamyelocytes		0	0	0·25	0·2	
Do. myelocytes		1·6	0·3	0·25	1·4	
Eosinophil polymorphs.		1·5	5·6	9·25	1·6	
Do. myelocytes		2·1	4·6	10·0	2·8	
Basophils		2·4	0·6	0·5	1·0	
Promyelocytes		3·6	19·6	1·5	8·0	
Myeloblasts		2·6	2·6	0·5	0·8	
Lymphocytes		29·8	12·6	31·0	8·0	
Plasma cells		1·2	1·0	6·75	2·2	
Reticulum cells		8·9	18·6	8·0	10·0	
Monocytes		35·3	21·0	7·25	44·6	
Erythroblasts		2·7	5·0	13·5	2·2	
Normoblasts		8·8	8·3	10·5	7·2	

norm. = approximately normal

Bone-marrow films obtained at autopsy (by Lieut.-Colonel G. L. Montgomery) showed well-preserved cells. There were occasional eosinophils but no neutrophil polymorphs. Myelocytes were extremely scanty and were all basophil in type. Myeloblasts, however, were very numerous, all apparently at the same stage of development, about equal in size with prominent nucleoli. There was some evidence of erythroblastic activity and megakaryocytes were in fairly normal numbers.

CASE 2.—A Polish soldier, aged 23, was admitted to hospital on Feb. 10, 1942, complaining of one day's sore throat. On Jan. 16 he had been found to have a primary chancre, confirmed by dark-ground illumination. Between Jan. 16 and Feb. 6 he had five arsenical injections (neo-kharsivan 0·3 g. and 'Novostab' 1·8 g.) and four injections of bismuth 0·2 g.

He was well nourished and of good physique. His face was pale and ill looking but mucous membranes were well coloured; lips dry and slightly blue. Temperature 102° F.; pulse-rate 96. The fauces were acutely inflamed and tonsils were deeply injected and swollen with small necrotic areas on both sides. Tongue moist and covered with a white fur. There was no enlargement of lymph-glands; the liver and spleen were not palpable. There were no hæmorrhages. BP 105/65 mm. Hg. The blood and bone-marrow findings are set out in the table. Pentnucleotide was begun on Feb. 11, 30 c.cm. being given intramuscularly on this day, 40 c.cm. on each of the next three days and 10 c.cm. daily for the next two days. On the day after admission some extension of the necrosis was noted; there was now a large ulcerated area on the left tonsil and a smaller area of a similar type on the pharyngeal wall. Temperature 102° F.; pulse-rate 120. Patient appeared very ill and had great difficulty in swallowing. On the first, second, third and fourth days of treatment the granulocytes numbered 28, 495, 1600 and 3000 per c.mm. On the fourth day his temperature fell to normal and there was a striking improvement in his throat and general condition. On Feb. 17 he developed an abscess of the left buttock at the site of the pentnucleotide injections and another rise of temperature took place. Pus was evacuated on Feb. 22, after which convalescence was uneventful.

CASE 3.—A soldier was admitted to hospital on March 28, 1942. On Jan. 26 he had developed gonorrhœa, and he had been given 19 g. of sulphapyridine in 3 days, the first dose on Feb. 2. On Feb. 21 a primary chancre developed and between Feb. 24 and March 20 he was given five arsenical injections (novostab 0·9 g. and neo-kharsivan 1·5 g.) and four injections of bismostab 0·2 g. Six days after his last injection he felt ill and complained of a sore throat.

He was a well-developed, well-nourished young man, flushed, sweating, apathetic and rather confused. Temperature 104° F.; pulse-rate 124. The submaxillary glands were palpable but there was no other lymph-gland enlargement. Tongue was moist and furred. The gums were inflamed and ulcerated around the alveolar margins and large necrotic ulcers were present on both tonsils. Examination of a throat swab revealed streptococci and staphylococci. BP 100/65 mm. Hg. Blood and bone-marrow findings are shown in the table. On the day of admission treatment was begun with 30 c.cm. of pentnucleotide; 40 c.cm. was given next day and thereafter 20 c.cm. daily until a satisfactory improvement took place. The patient was considerably confused during the first few days in hospital. On March 31, the fourth day of treatment, there was a distinct improvement in his general and local condition, his temperature became normal, and there was a striking increase in granular leucocytes in the peripheral blood, the number rising from 88 to 1000 per c.mm. in 24 hours. By April 14 he felt well, blood examination revealed no abnormalities and he was discharged from hospital.

CASE 4.—A merchant seaman, aged 28, was admitted to hospital on April 29, 1942. He had gonorrhœa in 1938, and in February, 1942, had a second attack. On March 26, 1942, he developed a primary chancre, and between that date and April 27 he was given seven arsenical injections (novostab 0·9 g. and neo-kharsivan 2·4 g.) and five injections of bismuth 0·2 g. On April 14 a purulent urethral discharge was noted and he was given 0·1 c.cm. of TAB vaccine, repeated in 2 hours. On April 22 a course of sulphanilamide was begun, 20 g. being administered in 3 days. On the evening of April 25 he felt ill and weak and developed a sore throat. On the 27th the tonsils were enlarged and inflamed, with many follicular points of pustulation. A throat swab showed only a few fusiform bacilli. Next day, blood examination revealed a neutropenia, granular leucocytes constituting only 20% of the white cells. The patient was given 10 c.cm. of pentnucleotide. On the 29th his temperature reached 104° F. and there was now a large sloughing film on the left tonsil extending back over the posterior pillar of the fauces; 20 c.cm. of pentnucleotide was administered.

He was a tall, well-built and well-nourished young man. His face was flushed and conjunctivæ slightly icteric. He appeared extremely toxic and was restless and somewhat confused. The tonsillar lymph-glands were enlarged and tender; slightly enlarged but firm and discrete glands were also palpable in the axillæ, groins and submandibular regions. The throat was very congested and swollen and showed extensive ulceration with a dirty pultaceous blood-stained slough involving both tonsils, the posterior pillars of the fauces, the soft palate and the pharynx. A gingivitis was also present. No other abnormality was noted on physical examination. BP 102/50. A throat swab showed streptococci, staphylococci and a few fusiform bacilli. The blood and bone-marrow findings are set out in the table. Pentnucleotide was continued after admission, 40 c.cm. daily being given. On May 1 considerable improvement was noticed, his temperature had fallen to normal and his throat was less inflamed. The granulocytes, which on May 30 had numbered 86 per c.mm., rose suddenly to 2500 per c.mm. Next day, however, he became hallucinated and was intermittently dis-

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orientated for place and time. This confusion persisted for only 3 days, after which he appeared mentally sound, with good insight into his condition. His convalescence thereafter was uneventful.

CASE 5.—A Polish seaman, aged 19, was admitted to hospital on May 13, 1942. On March 30 he had developed a primary chancre, confirmed by dark-ground illumination. Between April 10 and May 5 he had 2·1 g. of novostab in five injections and 0·6 g. of bismostab. On May 3 he complained of soreness of the gums and throat. In spite of full doses of 'Redoxon' and eight daily doses of 0·6 g. of 'Thiostab' the condition progressed. On May 13 his temperature was 103° F., bile was noted in the urine and blood examination revealed a low white-count and an absence of granular leucocytes.

On admission he looked pale, ill and somnolent; temperature 103° F., pulse-rate 114. His skin was dry and slightly icteric. His breath was foul and saliva was dripping from the mouth. There was an extensive ulceration and necrosis of the fauces involving the posterior parts of the gums, the anterior parts of which showed a diffuse inflammation. The submaxillary and upper cervical lymph-glands were enlarged and tender. A throat swab showed staphylococci and Vincent's organisms. Blood and bone-marrow findings are set out in the table. In spite of 40 c.cm. of pentnucleotide daily there was a progressive deterioration in his condition, and on May 17, after the development of a bronchopneumonia, he died. Frequent blood examinations had revealed no response to pentnucleotide therapy. A remarkable feature of the blood-picture, however, was the persistence of eosinophil and basophil granular leucocytes in spite of the total disappearance of neutrophil cells.

At autopsy bone-marrow films showed numerous cells of the lymphocytic series. The granulocytic series was represented only by a moderate number of eosinophil myelocytes and occasional basophil myelocytes. There were no polymorphs. There were a moderate number of cells of the erythroblast series.

CASE 6.—A Canadian soldier, aged 34, was admitted to hospital on July 4, 1942. In 1939 he had had a venereal sore which left a scar on the coronal sulcus. On April 16, 1942, he complained of a sore tongue; Wassermann and Kahn tests were weakly positive. Between April 16 and June 29 he received 5·7 g. of neo-kharsivan and 2·0 g. of bismuth. On June 30 he developed a rash and some "bruising" on the forearms, accompanied by vomiting, weakness and severe headache. During the next 2–3 days the rash extended, forming a generalised pruritic dermatitis of papular and eczematous plaque type, mainly on the extremities and with numerous purpuric petechial elements chiefly on the friction areas of the extremities. He also developed epistaxis, bleeding from the gums and soreness of the throat. On July 3 there was a well-marked granulocytopenia.

He was well built and well nourished but pale and ill looking; temperature 101° F., pulse-rate 126. The skin was dry with a dull red papular eruption all over the body, especially on the forearms, legs and shoulders; the papules were irregular in size and shape. There were also petechial and larger purpuric areas, mostly on the flexures, upper arm and back of thighs, where some of the papules were purpuric. The gums were spongy with a few marginal necrotic patches around the upper molar teeth. The throat was congested but not ulcerated. The tongue was moist but furred. The upper cervical lymph-glands were palpable but not tender; there were no other lymph-gland enlargements. The liver and spleen were not palpable. BP 110/78 mm. Hg. Capillary fragility was much increased. Prothrombin time 40 sec. Blood findings are set out in the table. He was given pentnucleotide daily but there was no appreciable alteration in the blood-picture and there was a steady deterioration in his condition. Temperature rose to 104° F. and pulse-rate to 140. He died on July 10.

Post-mortem examination of marrow from femur revealed that 85% of cells were of lymphocytic series, 1% were granular myelocytes of eosinophil and basophil type, 1% were of the erythroblast series and the remainder were monocytes and plasma cells. No megakaryocytes were seen.

DISCUSSION

The reason for the development of the blood dyscrasias after administration of the arsphenamines has been a matter of considerable speculation. One arsphenamine is no more liable to produce toxic effects on the hæmopoietic system than another (Farley 1930), and it seems probable that arsenic itself is not the factor concerned since only one case of severe agranulocytosis following inorganic arsenic has been described (Wheelihan 1928). There is much evidence to suggest that the presence of the benzene ring in the arsphenamine molecule plays an important part in the production of these toxic effects. Since Selling (1910) first described the depressant action of benzol on the hæmopoietic system, the harmful effect of this substance on the bone-marrow has been well recognised and the similarity in hæmatological features in the blood dyscrasias after arsphenamine and industrial benzol poisoning has been noted. A benzene ring is also present in those drugs, such as amidopyrin and the sulphonamides, which have led in some instances to agranulocytosis. Kracke and Parker (1939) have pointed out that only those substances which contain a benzol ring with an attached amino or nitro group, being thus readily oxidisable, are capable of producing bone-marrow depression. Kracke and Parker (1934) have shown that in certain persons amidopyrin may undergo an atypical oxidation and that some of its oxidation products have a depressant action on the hæmopoietic system. A similar process may be at work in bone-marrow dyscrasias following arsphenamine therapy. Certainly there is no evidence to support the suggestion that these cases have a congenitally weak hæmopoietic system.

The classification of the blood dyscrasias following arsphenamine is not entirely satisfactory. McCarthy and Wilson (1932) suggest three main divisions—(1) thrombocytopenic, with a subgroup thrombocytopenic and granulocytopenic; (2) granulocytopenic and agranulocytosis; and (3) aplastic. In the thrombocytopenic type the reaction occurs immediately or shortly after an injection and is characterised by purpura and hæmorrhages, a low platelet-count and a quick recovery to normal. Apart from the low platelet-count, the blood-picture is normal. The rapid reappearance of platelets on recovery is not in keeping with a toxic depression of megakaryocytes. Falconer and Epstein (1940) have been able to return a great number of platelets to the circulation in these cases by the injection of epinephrine hydrochloride 1 c.cm. and suggest that the condition is an allergic phenomenon. In view of the different mechanism of production, and the highly favourable prognosis in these cases of simple thrombocytopenia, it seems advantageous to group them separately from the other dyscrasias, which are characterised by various degrees of marrow depression. In this second group, the initial depressant effect is on the leucopoietic tissues, leading to granulocytopenia and agranulocytosis in the peripheral blood. This reaction often manifests itself soon after the first few injections of arsphenamine and can often be reversed if no more injections are given. The depression of megakaryocytes and the erythroblastic series, on the other hand, only develops as a rule after a considerable number of injections have been given, and the dyscrasia may not be found till weeks or even months after the last injection. The first five cases reported here demonstrate the early onset of agranulocytosis in the course of treatment with arsphenamine, the average number of injections given being five, the average dose 2·1 g. In case 6, the bone-marrow damage was more extensive; it affected the megakaryocytes, and, as shown by the post-mortem study of the marrow, the red-cell precursors also. The hæmatological picture is therefore that of an acute aplastic anæmia. In this case symptoms did not begin till 6–7 weeks after the beginning of antisyphilitic treatment.

The changes in the peripheral blood in the first five cases are not essentially different from those found in cases of agranulocytosis secondary to amidopyrin or other drugs or from cases of "idiopathic" agranulocytosis. It is interesting to note the higher percentage of monocytes in the white blood cells of the three cases of agranulocytosis which recovered. When first seen these patients showed a definite increase not only in the percentage but also in the absolute number of monocytes present. This is to be contrasted with the relatively low monocyte counts in the fatal cases. Increase of monocytes in the peripheral blood has been recorded by Beck (1933) and by Rosenthal and Abel (1936), who comment on the

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more favourable prognosis in these cases. Reznikoff (1938) also regards a monocytosis in agranulocytosis as a favourable sign and says that to be significant it must occur early and persist. The high number of monocytes in the cases with a favourable outcome and the frankly lymphocytic picture in the fatal ones seem to confirm their beliefs.

The bone-marrow findings reported show considerable variation. Even when the peripheral blood-picture is that of an aplastic anæmia (granulocytopenia, thrombocytopenia and erythrocytopenia), the bone-marrow may not be truly aplastic but may show only a decrease in mature elements (Lieberson and Weiss 1937). In other cases the marrow is hypoplastic or aplastic (Kadin 1938). Custer (1935) is of the opinion that cases of granulocytopenia after the use of arsenicals do not show the well-marked proliferation of myeloblasts found in cases of "idiopathic" agranulocytosis with "maturation arrest." The bone-marrows studied in the five cases of agranulocytosis described all showed a striking lack of neutrophil granulocytes (polymorphonuclears, metamyelocytes and myeloblasts) but in four of the cases there was a persistence of promyelocytes and myeloblasts. In case 1, where the marrow was examined post mortem, and to a lesser extent in cases 3 and 4 where the marrow was obtained by sternal puncture, there was a distinct increase in these immature cellular elements. This corresponds to the findings of Kracke (1941) in this condition and shows that "maturation arrest" may be found in secondary agranulocytosis just as in the idiopathic types.

With regard to treatment, Jackson and others (1932) who first sponsored the use of pentnucleotide in agranulocytosis emphasise that no striking improvement in the blood-picture can be expected until the third to sixth day of treatment; they say that this phenomenon is so constant that it may be taken as a criterion for judging whether a case has or has not responded to pentnucleotide. If we accept this criterion, a sufficient latent period is present in two of these cases to justify us in assuming that pentnucleotide was the effective agent. In case 2 improvement was more rapid, but even here it was the fourth day of treatment before a well-marked improvement took place. In both the two cases of agranulocytosis which did not respond, an obvious factor was the long delay between the development of the condition and the institution of appropriate treatment. These cases had no pentnucleotide for 11 and 10 days respectively, whereas in the cases with a favourable outcome treatment was begun between the second and fourth days. That the chances of recovery are much reduced if treatment is delayed is supported by the findings of Roberts and Kracke (1930) who have shown that the mere absence of granulocytes from the blood for 7 days is incompatible with life. Once the bone-marrow has been depressed to the aplastic state, as occurred in case 6, pentnucleotide is of no apparent value. If the marrow is not completely aplastic, blood-transfusion may tide the patient over a period of temporary marrow inactivity and lead to eventual recovery (Lieberson and Weiss 1937).

Early recognition and early treatment of the blood dyscrasias being so vital, it is essential that clinicians should be familiar with the early signs of toxic hæmopoietic effects. The occurrence of an inflamed and painful throat in all the cases of agranulocytosis described above emphasises the frequency of this symptom. In the early stages there are often clinically no distinguishing features between the ordinary inflamed throat and that of agranulocytosis or granulocytopenia, and if the true significance of the faucial inflammation is not realised further injections may be given, as in two of the cases described here and in the case reported by McGibbon and Glyn-Hughes (1943). In the early stages, only a blood examination will reveal the true significance of the faucial inflammation. Moore and Keidel (1921) mention itching and a fine rash as prodromata, but the only sure sign is neutropenia. Patients showing any signs of intolerance or reaction to arsphenamine should be suspected, and the development of faucial inflammation, stomatitis, purpura, a tendency to bruising, bleeding from the gums, weakness, pallor or any general reaction should be an indication for an immediate full blood investigation.

SUMMARY

Six cases of bone-marrow depression following the use of neoarsphenamine in the treatment of syphilis are described. Five had an agranulocytosis and one showed depression of all marrow elements.

In classifying the blood dyscrasias after neoarsphenamine, simple thrombocytopenia should be grouped separately from the other dyscrasias which are due to involvement of the bone-marrow.

An increased absolute number of monocytes was found in the three cases of agranulocytosis which recovered but not in the fatal cases. The monocytosis is regarded as a favourable prognostic sign.

In the cases of agranulocytosis, examination of the bone-marrow by sternal puncture and at autopsy showed evidence of a "maturation arrest" similar to that found in idiopathic agranulocytosis.

Pentnucleotide appears to be effective in this type of agranulocytosis provided treatment is not too long delayed.

My thanks are due to Dr. J. Norman Cruickshank and Dr. A. M. Dryden for permission to publish these cases; to Dr. Cruickshank and Major T. E. Anderson, command dermatologist, for their criticism; and to DDMS, Scottish Command, for permission to incorporate data from the military case-records.

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SLIDING GRAFT FOR UNUNITED FRACTURE OF TIBIA

B. H. BURNS
MB CAMB, FRCS
ORTHOPÆDIC SURGEON, ST. GEORGE'S AND BOTLEYS PARK (EMS) HOSPITALS

L. S. MICHAELIS
MD BERLIN, LRCPE
ASSISTANT ORTHOPÆDIC SURGEON, BOTLEYS PARK

JUDGING by the methods which have been described for grafting ununited fractures of the tibia, it appears that the sliding graft, with metal fixation, is not as popular as we think it deserves to be. The sliding graft has been our standard method at Botleys Park and has given satisfactory results in all but one of the 26 consecutive cases in which it has been used since June, 1940.[1]

The use of the sliding graft is particularly applicable to the tibia, for the size and shape of the bone allow a graft to be cut bulky enough for its purpose, while incision and exposure of the bone presents no difficulties or disadvantages here.

The alternative methods of grafting for fractures of the tibia, which have been preferred by many, include the use of a massive onlay graft from the opposite side, fixed by bone pegs or screws (Henderson 1936, Campbell 1932); an inlay taken from the opposite tibia and fixed by impaction only (Albee 1930); a massive graft, either from the other tibia, or sliding from the same tibia (Armstrong 1943). Steindler (1925) has used sliding inlays, but without metal fixation, in 15 cases, of which 12 were successful.

The probable reason why the sliding graft fell into disfavour, and less simple devices were employed, was that the sliding graft was not always made to give a firm

1. Several operations in this series have been carried out by Mr. R. H. Young, FRCS.

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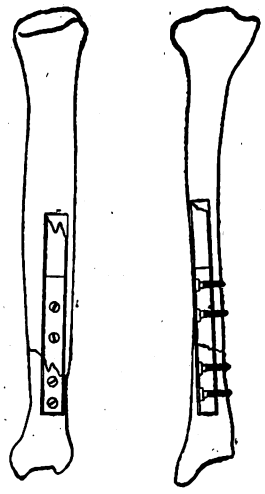
fixation. It was customary to attempt to get fixation by joinery alone. This is difficult and chancy and, even if it is achieved, absorption at the edges may lead to loosening at the 2nd, 3rd or 4th week. This difficulty is now overcome by the use of vitallium screws, which fix the graft firmly and permanently.

In our experience, vitallium is more satisfactory than any other metal. Of about 40 vitallium screws that have been removed from the tibia after plating, none was found to be loose. When other screws have been used, a considerable proportion could be pulled out without unscrewing.

OPERATION

A long skin incision is made over the anterior muscular compartment of the leg, about ½ in. lateral to the anterior border of the tibia. It is curved inwards at each end. The periosteum is stripped from the subcutaneous surface and a 5–6 in. graft is cut in the bone above the level of the fracture; and half that length of bone is removed from the subcutaneous surface below the fracture. If the cuts are made parallel to and 3 mm. from the edges of the subcutaneous surface, the graft will be slightly tapering from above downwards; it can be slid down as far as necessary, owing to the loss of substance from the sawing. When it is in place, the alignment of the bone will be correct. There is one exception to this, however, and that is that, where the fracture is low down, the graft has to be sunk fairly deeply into the cancellous bone in order to restore the normal varus curve. The saw cuts are not made in parallel planes but are cut sloping slightly together from before backwards, so as to give a bevelled effect. This will prevent the graft from sinking into the medulla, and this is desirable, except where counter-sinking is required in fractures at the lower end. The small lower piece can be used to reinforce the main graft at the fracture; otherwise, it is used to fill the space left by the sliding down of the main graft (see figure).



Lateral and antero-posterior views of tibia showing graft crossing the fracture line and firmly fixed with screws. In the A-P view note the counter-sunk lower end of the graft and the restored normal varus curve.

Where the fracture is near the upper end of the tibia, it is necessary to slide the graft from below upwards. This was done in 5 patients.

After the graft has been fitted, it is fixed by the insertion of 4–6 vitallium screws. The Sherman screw is the most suitable and gives the best grip, when inserted after drilling with a 7/64th drill, as this is slightly smaller than the root diameter of the screw. The insertion of the screw is facilitated by the use of a reamer. A well-padded plaster is applied from the groin to the toes. This is removed at the end of a fortnight, when the stitches are taken out and a slightly padded walking plaster is applied. Walking is allowed at 3 weeks.

RESULTS

It is noteworthy that in no instance was the shortening more than ¾ in. In 2 patients, not included, a considerable gap had to be bridged. The sliding graft is not suitable for this; bone has to be taken from the other tibia. Where there was little or no displacement, the bone ends were not disturbed (Burrows 1940), the graft being slid across and the medullary canal being restored by clearing out the dead bone (11 cases). Where there was displacement, this was corrected and the sclerosed ends were freshened (15 cases). In none of our patients was the fibula ununited, and when it was keeping the ends apart, it was either fractured or divided so as to allow the necessary contact to be made (8 cases).

The age of our patients varied from 18 to 65. The interval between injury and graft was 3½–5 months in 10 cases, 6–12 months in 10, and 1–2½ years in 6. Those in the early group were operated on only when it was clear that union would be greatly delayed—i.e., there was considerable mobility at the fracture, with the ends becoming sclerosed, or with unsatisfactory apposition.

There were 15 compound fractures. In those that were infected, operation was not performed until at least 3 months after the cessation of discharge. In one of them the operation was responsible for lighting up previous infection; 3 others had some infection afterwards, but this seemed to be due to superficial sepsis, associated with sloughing of a small area of skin, where there had been an adherent and thin scar at the site of a previous wound. In only one case was the sepsis very troublesome; at one stage, the graft was visible through the defect in the skin, and 10 months after operation the graft showed absorption.

None of the patients had a skin graft performed before bone-grafting. Some risk in this respect was accepted in one or two cases in order to avoid the considerable delay which a pedicle skin graft involves. In one case, by mishap, the graft became contaminated at operation; it was boiled and union proceeded normally.

We have regarded the fracture as united when the plaster is finally removed and unprotected weight-bearing is allowed. Clinical tests for union are of little value after grafting, and the decision rests on the X-ray appearances. Of the 26 fractures in this series 21 were united in 3–4 months, 3 at 5 months, and 1 at 7 months; 1 failed to unite.

CONCLUSION

Of the methods of grafting for non-union of the tibia, sliding inlay, fixed with vitallium screws, is the simplest; and it does not necessitate borrowing of bone from the other leg. If it is effective, it has obvious claims to preference. We are well content with the results in 25 out of 26 consecutive cases.

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TRYPANOSOMIASIS TREATED WITH PENTAMIDINE: A FATAL CASE

G. McCOMAS
M D LOND, M R C P
LIEUT.-COLONEL R.A.M.C.; OFFICER I/C MEDICAL DIVISION

N. H. MARTIN
B M OXFD, M R C P, F I C
MAJOR R.A.M.C.; PATHOLOGIST TO A MILITARY HOSPITAL, W. AFRICA

SCANT reference has hitherto been made in the literature to the treatment of trypanosomiasis with 4:4′ diamidinodiphenoxypentane (pentamidine), the most active of certain aromatic diamidines tested against trypanosome infections in laboratory animals by Yorke and Lourie (1939).

Saunders (1941) give details of 14 cases treated in the Gold Coast. The conclusions he reached were that the peripheral blood was sterilised by four injections of the drug; that 7 out of 10 central nervous system cases were possibly cured; that up to 65 injections were given without ill result, and that untoward results are trivial. Lawson (1942) records 53 cases treated in Uganda in 1941. He gave ten daily intravenous injections in doses varying from 0·05 gramme to 0·2 gramme and found this dosage to give satisfactory results. He found that rapid peripheral sterilisation of blood and gland juice was achieved, and that toxicity was low, especially in comparison with tryparsamide. He mentions the following toxic manifestations: increased pulse-rate, feeling of heat all over the body, itching, nausea and vomiting, giddiness and shivering, fall in blood-pressure and complete collapse resembling surgical shock (one case). He does not advocate the use of pentamidine in cases where examination of the cerebrospinal fluid shows serious CNS involvement. Gilbert (1943) reporting a series of 14 patients treated with pentamidine comments that daily intravenous administration of more than 2 mg. per kg. body-weight may produce severe headaches and rigors.

A case is described to show that the drug may have more serious consequences.

A Gold Coast soldier, aged 28, was admitted to hospital on Feb. 26, 1943, complaining of malaise and pain in the neck of 3 days' duration. On examination he was found to

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be somnolent, and a moderately enlarged gland was found in the right posterior cervical region. No other abnormalities were detected on physical examination. On March 4 two trypanosomes (*T. gambiense*) were found in a blood film. Gland puncture was negative. CSF : red cells 160 per c.mm.; white cells 170 per c.mm. (polymorphonuclears and lymphocytes); trypanosomes not seen; protein 40 mg. per 100 c.cm.; Kahn negative. On March 10 and March 11 the patient was given 0·1 g. pentamidine, which had been freshly prepared for use on March 10. Immediately after each injection he complained of pain in the left temporal region, the duration of the pain being about 2 minutes. On March 13 the patient was given a third injection of 0·1 g., the solution being freshly prepared. Ten minutes later he became unconscious and passed into status epilepticus. The fits were controlled after 2½ hours by intravenous 'Pentothal.' Except for two occasions when he regained consciousness for a few minutes he remained semiconscious and incontinent and could be made to swallow only with difficulty. On examination he showed strabismus; pupils equal and reacted to light. No superficial reflexes were obtained. Plantar reflexes flexor. Heart, lungs and abdomen normal. Blood-pressure 120/80 mm. Hg. He became pyrexial soon after the fits began, the temperature remaining between 102° and 105° F. till his death.

On March 18 the CSF showed 190 cells per c.mm., 90% lymphocytes; protein 40 mg. per 100 c.cm.: slight increase in globulin. Fundi showed bilateral papillœdema. On March 20 he became completely unconscious and was unable to swallow fluids. Intravenous glucose saline was given from then till his death on March 27. On March 25 the CSF showed 230 cells (predominantly lymphocytes) per c.mm.; protein 60 mg. per 100 c.cm.; chlorides 860 mg.; no trypanosomes. On March 26 he developed a bronchopneumonia of the left lower lobe. Temperature, pulse- and respiration-rate rose, and he died at 8 AM on March 27.

A complete autopsy was carried out within an hour of death. The lymph-nodes were enlarged throughout the body; on section they were firm, rubbery and greyish pink. The cortex of the brain was flattened, purple-grey, and the meninges round the base were a little thickened. On histological section perivascular cuffing, the character of which conformed to Mott's descriptions in 1907, was widespread. In addition there were small capillary hæmorrhages and some neuronophagia in the grey matter above the central sulcus. The foci of lymphocytes and trypanosomes described by Laveran and Mesnil (1907) as occurring in the myocardium could not be demonstrated. The only other pathological changes of any significance were terminal hypostatic bronchopneumonia in both lower lobes, early fatty degeneration of the liver, and a small papillomatous lesion of *Schistosoma hæmatobium* in the bladder. Careful examination yielded no evidence of renal disease, nor any pathological changes in the vascular network other than those described in the central nervous system, which could have caused epileptiform fits or produced coma. No cerebral tumour was demonstrable and the blood Kahn was negative.

The morbid anatomical findings were in complete accord with those of trypanosomiasis, there being a superimposed hypostatic bronchopneumonia. Inoculation of the patient's blood taken 36 hours before death into two gambiense rats, giant rats (*Cricetomys gambianus*), failed to disclose trypanosomes. The giant rat is extremely susceptible to infection with *T. gambiense*. Moreover, in spite of repeated attempts, we failed to find trypanosomes after the start of treatment with pentamidine in blood, CSF and lymph-node juice, though they were clearly demonstrated in the bloodstream before treatment.

It is difficult to avoid the conclusion that the sudden onset of status epilepticus and of coma was directly connected with the administration of the drug. There seem to be two possibilities: either the status epilepticus and coma were the direct result of the drug on the central nervous system, or they arose from a Herxheimer reaction analogous to that produced by neoarsphenamine. The pathological findings suggest that the latter explanation is the correct one. This is the only death we have had while using pentamidine.

SUMMARY

A man suffering from trypanosomiasis died during treatment with pentamidine. After 3 injections status epilepticus and coma developed. No evidence of trypanosomes could be found in the blood or CSF 36 hours before death or on histological examination of the tissues after death. The possibility of death being due to a Herxheimer reaction is suggested.

Our thanks are due to Colonel J. P. J. Jenkins, commanding officer of the military hospital, for permission to publish this case; to Brigadier R. A. Hepple, DDMS, West African Force; and to Brigadier G. M. Findlay for providing us with the pentamidine and for his help and encouragement.

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Medical Societies

ROYAL SOCIETY OF MEDICINE

AT the epidemiology section on Feb. 25, with Sir WELDON DALRYMPLE-CHAMPNEYS, the president, in the chair, a discussion on the diagnosis and treatment of

Sinusitis in Children

was opened by Mr. H. BEDFORD RUSSELL. Dealing first with the physiology of the paranasal sinuses, Mr. Russell pointed out that the mucous lining covered some 40 square inches and was supplied with a ciliary mechanism which ordinarily prevented foreign particles from entering the sinus, and wafted any such material backwards to the nasopharynx. The cilia were paralysed by adrenaline, but not by salt solution or cocaine. Dyes were readily absorbed from the sinuses, and passed to the cranium as well as into the general circulation. Any infection tended to close the ostia and thus dam up secretion, which might become so inspissated that it could not easily be removed. There was a close connexion between upper and lower respiratory tracts. Infections that were common precursors of acute sinusitis were measles, pertussis, influenza and pneumonia; sometimes a streptococcal infection might produce an acute œdema without pus formation. Transillumination was not necessarily diagnostic. Treatment of the acute infection should aim at encouraging the flow of secretion by temporarily shrinking the mucous membrane with a vasoconstrictor, such as 1% ephedrine or ephedrine and cocaine. Alternatively, vasoconstricting vapours, such as amphetamine, could be used. Other treatments were lubrication with an emollient oil, lavage, or small doses of potassium iodide. Chronic sinusitis might be accompanied by a great variety of symptoms—nasal catarrh, sore throat, cervical adenitis, headache, otorrhœa, eye defects, enuresis, mental fatigue. In a proportion of cases there was an associated allergy. The treatment of choice for chronic sinusitis was lavage by "displacement," the technique of which was demonstrated.

Mr. S. E. BIRDSALL discussed ætiology, diagnosis and treatment in 80 cases of acute sinusitis. Only a small proportion gave a history of antecedent specific fever, pertussis being the most frequent precursor. Pain, loss of function and obvious discharge were less easily recognised in acute sinusitis than in the comparable infection in the middle ear. Anterior rhinoscopy was an invaluable aid and posterior rhinoscopy was also helpful. The symptoms in order of frequency were these: (1) Nasal obstruction; about half of these cases had already had an operation for enlarged tonsils and adenoids, so enlarged adenoids was not, in his opinion, a common cause of nasal obstruction, and the so-called adenoid facies could be caused by chronic sinus infection. (2) Persistent cough. (3) Repeated colds; non-infective allergy was rarely an associated condition, although there might be a bacterial allergy. (4) Anorexia. (5) Otorrhœa. Treatment was along the lines recommended by Mr. Russell.

Mr. A. G. WELLS believed that repeated colds and sinus infection led to defective nasal respiration and mouth-breathing, which in turn predisposed to respiratory infection and impaired mental and physical function. The remedy was "diastolisation," using hollow rubber bougies adapted to the nasal passages and rhythmically dilated and collapsed by an attached pneumatic bulb.

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Dr. WILLIAM GUNN had found acute sinusitis a rare complication of the childhood fevers. Only 5 cases were diagnosed among nearly 3000 children under 14 years admitted to the North-Western Hospital during 1943; 3 followed measles, 1 whooping-cough, and 1 scarlet fever. All occurred in the winter months and the stay in hospital was greatly prolonged because of this complication. In view of the importance attached to parenteral infection in the ætiology of gastro-enteritis, the possibility of sinusitis should be considered as a contributing factor, although the paranasal sinuses were not ordinarily pneumotised in these young infants.

Dr. ROBERT CRUICKSHANK remarked that this was a meeting of the epidemiology section, and there were two sides to the problem of sinusitis—the danger to the affected child, and the risk to the community of a nasal carrier of pathogenic organisms. Chronic sinusitis was often masked by such symptoms as persistent cough, sore throat, headache and lassitude. If cultures gave a practically pure growth of a particular pathogen—the infecting organisms in order of frequency were *hæmolytic streptococcus*, *Pneumococcus*, *Staphylococcus aureus*, *Friedländer's* and *Pfeiffer's bacillus*—an autogenous vaccine was often beneficial. On the epidemiological side, the nasal swab was too often omitted in the search for a carrier. The midwife, the surgeon and the dresser should mask the nose as well as the mouth, but it was well to remember that certain infections normally regarded as exogenous—e.g., wound and puerperal sepsis, lobar pneumonia—were in a proportion of cases autogenous.

Mr. T. B. LAYTON made a plea for a more exact definition of sinusitis, which to him meant pus in the sinuses. He did not believe it was a common complication of childhood fevers, and for its cure he advised simple remedies—nose blowing, suitable exercises and a well-balanced diet.

The PRESIDENT wondered if excessive nose-blowing might not have its dangers by favouring an extension of infection to the middle ear.

MANCHESTER MEDICAL SOCIETY

AT a meeting of the society on Feb. 9 a paper on

Plastic Surgery in Relation to General Surgery

was read by Mr. PETER GABARRO, former secretary of the Society of Surgeons of Catalonia. Plastic surgery should not be considered as an isolated science but as a surgical specialty like orthopædic or cancer surgery. To shorten the healing period after an injury to the superficial tissues he advised immediate repair if possible, early grafting if a raw area is present, removal of scar and repair of the deformities if the process of natural healing has led to abnormal conditions. He stressed the importance of very early repair in facial fractures and referred especially to the easy repair of malar fractures if done early. In facial burns, he said, an important emergency treatment is protection of the eyes, which should be done as soon as possible by covering the eye with the conjunctiva and grafting over it. Fresh raw areas should be grafted very soon, for granulations are not essential for successful grafting. It is always good treatment to skin-graft a raw area as early as possible in order to avoid the development of a vicious circle formed by the three elements: raw area, infection and discharge. Good results require good general condition, good local blood-supply, drainage (in unhealthy raw areas) and epithelial protection. The individual type of grafts, in squares as devised by the lecturer, may succeed where other grafts may fail. When possible, a big sheet of graft is preferable, but the thinner the graft the better it takes and the thicker the graft, the better should be the quality of the skin obtained. Correct balancing of these two principles leads to the selection of the proper type of graft. Scars should be removed after "rest" of the area affected and the ideal should be to remove "the scar, the whole scar, and nothing but the scar." Partial removal is never advisable. Speaking of the necessity for collaboration between the plastic surgeon and other branches of surgery he gave as examples repair of hands with reconstruction of fingers; repair of cranial injuries with replacement of soft tissues and bone-graft; removal of malignant tumours followed by immediate plastic repair; successful removal of a gigantic scalp tumour followed by complete grafting; fistulæ of the mouth after necrosis; a complete rhinoplasty after the removal of an epithelioma of the nose; and some cases of repair of facial injuries in Service patients. Summarising he said that raw areas should be avoided as much as possible, and skin-grafts should be done more generally. The emergency repair, which should be as complete as possible, especially in injuries of the face, is essential for the quick recovery of the patient and for shortening his stay in hospital. Scars are abnormalities and they all have possibilities of repair. The scope of plastic surgery in unlimited, and its principles can be a big help to general surgery.

Reviews of Books

Elements of Medical Mycology

JACOB HYAMS SWARTZ, MD, assistant professor of dermatology, Harvard Medical School. (Grune and Stratton. Pp. 179.)

FOR many laboratory workers the only available descriptions of the pathogenic fungi are those squeezed into the last few pages of textbooks of bacteriology or tropical medicine. This book, written by a dermatologist, with bias towards the laboratory side, gives clinical accounts of the main fungus diseases and details of treatment. The opening chapters explain what fungi are, how they grow and the laboratory methods used in diagnosis. The main part of the book deals with infections, such as moniliasis, caused by the yeast-like fungi, and with the group of diseases caused by the genera microsporon and trichophyton. Briefer descriptions are given of a variety of pathogenic fungi such as the interesting *Coccidioides immitis*, actinomyces and the agent responsible for maduromycosis, one of India's endemic diseases. A chapter on the common fungal contaminants met with in the laboratory should encourage the bacteriologist to adopt a scientific attitude to a minor irritation. Little appears to be known about the immune reactions given by patients suffering from fungus diseases and the same is true of the effect of the sulphonamides in treatment. In covering much in short space, important points may be missed, but this book caters admirably for the beginner. Mycology lends itself to a glossary and good photography: this book has both.

Chest Examination

R. R. TRAIL, MC, MD ABERD, FRCP, group-captain RAFVR; physician to Royal Chest Hospital. (Churchill. Pp. 106. 10*s*. 6*d*.)

CLINICAL examination of the chest and proper evaluation of the findings has been partly superseded in recent years by dependence on the X-ray film, which now threatens to become absolute. Group-Captain Trail is alive to this danger and sets out to correlate physical signs with pathological changes and radiographic appearances. The result is a thesis rather than a textbook. The reasoning is distinctive, in places unorthodox, and not always quite accurate; too much compression makes the argument in places difficult to follow. As a corrective the book takes a high place in contemporary medicine. Much in it will be stimulating to the expert but it is less suitable in its present form for the undergraduate reader for whom it is primarily intended.

Atlas of Obstetric Technic

PAUL TITUS, MD, obstetrician and gynæcologist to St. Margaret Memorial Hospital, Pittsburgh. (Kimpton. Pp. 180. 36*s*.)

WITH the help of E. M. Shackelford, medical illustrator to the hospital, this work presents obstetric technique pictorially, including the various measures for the investigation and treatment of sterility. Each section is preceded by a short descriptive outline, and the comments which accompany each picture are brief—in some instances too brief. The pictures are beautifully drawn and reproduced but are, one feels, too much simplified to be of use to the experienced obstetrician, and not explanatory enough for the less experienced. Many will question the wisdom of packing the uterine cavity for post-partum hæmorrhage.

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THE LANCET

LONDON: SATURDAY, MARCH 11, 1944

ANÆSTHETIST'S OPPORTUNITY

THE practice of anæsthetics has never been as simple as some would make out, but it has been made more complicated by the discovery of new agents and methods, and more exacting by the ever-increasing demands of modern surgery. Wider knowledge has now placed the subject on a scientific basis, yet it still seems to many keen newly qualified men to offer but a restricted field. They see the present practice of anæsthetics too often limited to actual administrations in the theatre. This state of affairs originated almost inevitably from the demands made upon anæsthetists—frequent and long operative sessions at voluntary hospitals having to be balanced by private cases at scattered nursing-homes in order to gain a livelihood. Such men became technically very expert, but that was sometimes the total of their contribution to medicine. Small wonder that the more highly qualified man who demands a wide scope for his abilities is seldom attracted into making anæsthetics his career. Merely to deplore the present status and passively to hope for better times is useless; something active must be done about it. Improving the training of would-be anæsthetists and widening the scope of the subject in order to give full expression to their talents is the first logical step.

What should the whole-time anæsthetist be able to offer to the common weal? First and foremost, of course, he must be expert in a wide range of agents and methods, so that he can choose and apply the best one for the case in hand, and he must be capable of giving the surgeon an accurate opinion on the patient's condition during operation. But, in addition, as a result of his training and observations in the theatre he should be able to place special knowledge and experience at the disposal of his medical and surgical colleagues in the wards. Thus NOSWORTHY lately urged at the Royal Society of Medicine[1] that, by reason of his familiarity with endotracheal techniques, he should regard as one of his duties the treatment of patients with excessive tracheobronchial secretions or atelectasis. This is but one instance. Well acquainted as he is with depressant drugs and compressed gases, and meeting as he often does in the theatre with abnormal respiratory and circulatory states, the anæsthetist should be well qualified to treat or give advice on resuscitation, inhalation therapy of all kinds, barbiturate and gas poisoning, asphyxia neonatorum, and the choice of suitable drugs in tetanus and other conditions requiring special sedation. He should possess sufficient knowledge of regional analgesia to undertake diagnostic and therapeutic nerve blocks. For the man with a bent for research countless problems await solution and by the very nature of his work the anæsthetist should help to bridge the gulf between the physiologist and pharmacologist and the clinician.

Now that many young anæsthetists are employed on whole-time work at one hospital the situation affords a golden opportunity. It is up to those engaged in the specialty to seize it. They must bestir themselves now, go into the wards, and take their share in the preoperative and postoperative treatment of patients. If they can show that their efforts are of value they will be welcomed, and recognition will certainly follow. Having broken the circle which confines their art within the narrow limits of the operating-theatre anæsthetics will take its rightful place alongside other specialties, and in future there will be no dearth of the right type of recruit.

1. See *Lancet*, Feb. 12, 1944, p. 222.

COMMUTERS

THAT understanding and friendship between nations is the only sure guarantee of world peace is a self-evident proposition, stated in round terms some 25 centuries ago by ISAIAH. Though there is no immediate prospect of righteousness covering the earth as the waters cover the sea, it is pleasant to mark any steps towards international amity and concord.

With few exceptions, the followers of medicine have not ceased to regard themselves as servants of mankind, and there will soon be ample scope for all the conciliatory influence they can exert. Meanwhile a useful start has been made in a small way by the European Association of Clinical Pathologists, which, though less than a year old, has already 70–80 members drawn from 14 different countries. This group looks forward to the time when through branches all over Europe it will play an active part both in the further development of medicine and in drawing medical communities together. Branches may be formed by ten or more members of the association living in any convenient geographical area, and it is hoped that such areas will be chosen with more regard to cultural than to political affinities. Though locally autonomous, the branches will be sections of the association, and only its elected members will be eligible for admission to them. The affairs of the association as a whole are vested in a council consisting of 12 members of whom not more than 3 may be permanently domiciled in any one European country. This council is already in being under the presidency of Dr. S. C. DYKE, formerly president of the British Association of Clinical Pathologists, with Prof. E. J. BIGWOOD of Brussels as vice-president.

Implicit in this new organisation is the will to break down barriers and bring about free commerce of ideas between the medical communities of Europe. As one means to this end the council is making a plan for the interchange of personnel between the various countries. It points out that hitherto such international reciprocity between scientific workers as has been realised has been brought about mainly through the agency of institutions and has necessitated considerable financial backing. The association wants to make it possible for individual workers in clinical pathology in different countries to interchange easily and freely. This would be a matter of agreement between the workers themselves, with the consent of their departments, and need involve little expense, the chief requirements being a central bureau, which the association proposes to set up, and the coöperation of the heads and the controlling authorities of suitable hospital laboratories. The council uses the term "commuter" (*commute*—to put each in the place of

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the other: O.E.D.) to designate the two parties to an exchange; and this seems an appropriate word, except that in the United States it unfortunately means something else—a season-ticket holder. It is suggested that commuters, while sojourning abroad, should receive maintenance allowance in the currency of, and according to the custom of, the country in which they are working. The necessary financial arrangements would be made by the secretary of the bureau in consultation with the secretary of the local branch of the association, and the secretaries of the local branches would have an eye to the comfort and well-being of commuters in their district.

This project, if fulfilled, can hardly fail to be valuable in forging links between workers in this particular field of medicine, and it will command the sympathetic attention and support of all who wish for the disappearance of national barriers. The method of approach adopted by the clinical pathologists may well commend itself to other societies devoted to other departments of medicine, and indeed to bodies of many sorts interested in the furtherance of science and learning.

HAZARDS IN THE TREATMENT OF VARICOSE VEINS

RESECTION of the proximal two inches of the great saphenous vein, with immediate injection of a sclerosing solution, is a well-established treatment for severe varicose veins. The operation is undertaken without much fear for life or limb. True, the femoral vein is close to the site of operation and its damage is always possible—cases have been reported of its mistaken ligature—but average skill should avoid such calamities. ATLAS[1] however describes several untoward incidents, not due to carelessness, which though uncommon may have such serious results that surgeons should be on their guard against them. In 5 cases thrombosis spread into the deep veins of the thigh, producing an embolus in 3 cases, with 2 deaths. ATLAS believes that the retrograde injection of a sclerosing solution at the time of resection of the saphenous vein should be discarded. In his view injection should be done in ambulant patients only; even the short recumbency needed after the resection operation may determine thrombosis in the ileo-femoral vein. Injection through a ureteric catheter passed down the distal portion of the vein has been suggested, but branches of the saphenous vein below the knee may communicate with the popliteal vein so that little is gained. There is the added danger of injury to the wall of the vein by the tip of the catheter, with leakage of the sclerosing solution into the perivenous tissues. In the ambulant patient the venous tree is usually well open, and the flow of blood swift; this is an insurance against thrombosis. Unfortunately it is not a complete insurance, for ALTAS reports a case in which popliteal thrombosis and non-fatal pulmonary embolism followed injection of 0·5 c.cm. of 5% sodium morrhuate into a moderate-sized varix on the medial aspect of the left calf. Division of the femoral vein between ligatures, under local anæsthesia, led to an uneventful recovery. Disturbed by this case, and by reports of similar calamities, ATLAS has investigated the fate of radio-opaque solutions injected into the normal saphenous vein. The solution rapidly found its way through anastomoses between the lesser and the great saphenous veins. Once in the lesser saphenous vein, the passage to the popliteal vein was quick and easy.

The importance of the deep communicating veins has been rather overlooked. HELLER[2] points out that most of the blood in the superficial veins returns to the heart via these communicating veins. He regards the upper end of the long saphenous vein merely as an overflow pipe, and draws attention to the common finding at operation that the saphenous vein at the fossa ovalis is surprisingly small compared to the veins in the lower leg. On muscular activity the contracting calf muscles squeeze the blood out of the deep veins lying within the fascial sheaths. As the muscles relax blood is sucked from the capillary bed, and also by means of the communicating channels from the superficial veins. HELLER has checked this by estimations of leg-to-throat circulation-time and by radiographic studies with a solution of iodo-hippuric acid having the same specific gravity as the blood. He points out that when a patient is standing quietly the saphenous vein may take 10 minutes or more to empty. When the muscles are flaccid there may thus be a considerable hold-up of the injection solution, and this may explain the violent reactions in the superficial veins often seen when ligature and injection are done under general anæsthesia. If the patient is up and about the injected solution is rapidly swept away and diluted in the blood-stream, so that its action is short-lived. Injection of the solution at operation also commonly results in spilling or leakage with subsequent local necrosis, especially in inexperienced hands. The slow healing of varicose-vein operations has given much concern to those responsible for Service patients. An increasing number of surgeons prefer to do a thorough Trendelenburg operation. The saphenous vein and its tributaries are ligatured at the fossa ovalis, further subcutaneous ligatures are done lower down, and any varicose mass is excised; injection therapy is used for any remnants. Pulmonary embolus after the ligature and injection method is a complication to be feared; non-fatal emboli are probably common. The usual explanation given is that the ligature site in the fossal ovalis has been the starting-point of the clot. In the light of ATLAS's findings, the injection fluid seems to be the direct cause of the thrombosis of the deep vessel. It would be instructive to know whether embolism has followed ligation only, without any injection therapy.

Individual sensitivity to particular solutions has been recognised as an incidental hazard since injection treatment of veins was first started. Perhaps because one of his clinic patients died from a fatal reaction to quinine and urethane, ATLAS considers it a dangerous drug and advises that its use should be discontinued. He tests the sensitivity of the patient to the sclerosing solution by a very small intravenous injection, preferably given into the varix it is proposed to thrombose. A tourniquet applied so that it fits into the crease behind the knee will occlude the lesser saphenous vein before its junction with the popliteal vein. The patient remains standing during

1. Atlas, L. N. *Surg. Gynec. Obstet.* 1943, 77, 136.

2. Heller, R. E. *Ibid*, 1942, 74, 1118.

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the injection and for five minutes after it, when the tourniquet is removed and he is told to walk about to disperse any solution from the deep venous system of the leg or thigh. DODD,[3] on the other hand, thinks sodium morrhuate both ineffective and dangerous; he has heard of several deaths and knows other cases of anaphylactic collapse after its use. He is now trying 30% saline, which has the merit of safety. Where the femoral vein has been tied in error and injected, he advises that the ligature should immediately be untied, the blood allowed to sweep out, and the vein irrigated. Such accidental injection of the femoral vein has been followed by gangrene of the leg; similarly, the accidental injection of quinine and urethane into a deep artery of the leg has led to gangrene of the foot. But emphasis on these hazards paints far too gloomy a picture; in actual practice the results of ligature and injection are particularly happy and curative. At the Mayo Clinic,[4] where they have done over 2900 cases, simultaneous ligature and injection remains the usual practice in 80% of cases, the remaining 20% requiring only local obliteration.

HÆMOPOIETIC STIMULATORS AND LEUKÆMIA

SUPERFICIALLY there is a strong resemblance between the histological changes seen in the blood-forming tissues in pernicious anæmia and leukæmia; both show greatly increased cellularity with proliferation of erythropoietic or leucopoietic tissues. But there the resemblance ends. In pernicious anæmia the proliferating cells are largely a class of cell not normally present at all in adult blood-forming tissues—the megaloblasts, which after their fashion become mature. In leukæmia the cells, even though sometimes primitive, can all be found in normal bone-marrow, but their maturation is often disturbed. These differences are brought out in two recent researches on hæmopoietic stimulators. LIMARZI[5] studied the effect of arsenic on the bone-marrow cells in pernicious anæmia; arsenic is a classical remedy for this anæmia and was always given in the days before liver extracts. He found that arsenic stimulates the development of hæmoglobin in the megaloblasts, but at the same time it poisons them and hastens the disappearance of their nuclei; this is therefore a pathological stimulation and is only temporarily effective. Liver extract is not a "stimulator" of red-cell formation; it is apparently an essential factor for the production of normal red cells and when it is given to pernicious anæmia patients normoblastic replaces megaloblastic erythropoiesis. The absence of stimulators does not play any part in the ætiology of pernicious anæmia.

Leukæmias are most commonly looked on as neoplastic in nature, but in man especially there are some facts that are difficult to fit in with this view and several efforts have been made to get them into the "deficiency disease" class. MILLER and his associates in Philadelphia[6] have now propounded a theory that explains leukæmia on the basis of a disturbance of the specific stimulators of myeloid (i.e., granulocyte-forming) and lymphoid tissues. They found that from the urine of patients with leukæmia substances could be obtained which when injected into guineapigs caused proliferation of their myeloid and lymphoid tissues; guineapigs were chosen because spontaneous leukæmia is rare among them. These substances induced changes in the guineapig tissues similar to those seen in the human subject—for example, in the liver, urine from a case of chronic myeloid leukæmia caused proliferation of granulocytes diffusely spread between the cords of liver cells; urine from a case of chronic lymphatic leukæmia caused proliferation and accumulation of lymphocytes in the periportal zones. Urine from cases of acute leukæmia produced changes similar to those from the chronic cases; acute monocytic leukæmia caused a mixed myeloid-lymphoid proliferation. So far there appear to be two fractions obtainable from the urine of leukæmic cases, one lymphoid-stimulating and one myeloid-stimulating; in normal urine they could not be detected. Nevertheless, the Philadelphia workers assume that these stimulators are present in the normal blood-stream; they further assume that the substances are "mutually reciprocal" in action—i.e., the myeloid substance stimulates proliferation of granulocytes but does not make them mature; maturation is controlled by the lymphoid substance which also has a damping effect on proliferation; and vice versa for lymphoid tissues. Normal formation of white blood-cells depends on the balanced action of these two stimulator-inhibitors; if this balance is disturbed leukæmia may result. Thus chronic myeloid leukæmia is explained by overproduction of myeloid substance with normal production of lymphoid so that there is overproduction of mature granulocytes; if the lymphoid substance becomes exhausted there is an "acute transformation"—overproduction of myeloid cells without maturation. Acute myeloid leukæmia may be due to a deficiency of lymphoid (myeloid-maturing) substance; acute monocytic leukæmia is rather surprisingly put down to excess of both myeloid and lymphoid substances; aplastic anæmia is produced by deficiency of both factors.

This may well seem an elaborate theoretical scaffolding to erect on the basis of these animal experiments—too elaborate perhaps to carry conviction—and we cannot help remembering that there is a well-stocked graveyard of theories about leukæmia. Nevertheless the theory will have to be followed up, based as it is on clear-cut animal experimentation, and it has some attractive points. It explains the clinically striking difference between acute and chronic leukæmias, ranging the former with pernicious anæmia as a deficiency disease—a deficiency that can perhaps be rectified with the possibility of controlling the tragedy of acute leukæmia. It holds out hope of obtaining efficient agents for the therapeutic stimulation of granulocyte and lymphocyte production. MILLER's ideas offer well-defined points that can be repeated and tested by others—the histological changes in the guineapig have already been confirmed by HEINLE and his colleagues[7]; MILLER will certainly develop them and we hope others will as well; in spite of legitimate scepticism this seems a hopeful line of inquiry.

3. Dodd, H. *Proc. R. Soc. Med.* 1943, **36**, 191.
4. Larson, R. A. and Smith, F. L. *Proc. Mayo Clin.* 1943, **18**, 400.
5. Limarzi, L. R. *Amer. J. med. Sci.* 1943, **206**, 339.
6. Miller, F. R. and Turner, D. L. *Ibid*, p. 146.
7. Heinle, R. W., Wearn, J. T., Weir, D. R. and Rose, F. A. *Ann. int. Med.* 1942, **17**, 902.

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Annotations

PRIME MINISTER AMONG THE PHYSICIANS

NEARLY 250 fellows of the Royal College of Physicians of London sat down to luncheon on March 2 and welcomed at their party over fifty guests headed by the Prime Minister himself. The guests included many of HM Ministers, and they heard Mr. Churchill explain how the antiquity of the College contrasted with the youth of the Ministry of Health. "The longer you can look back the further you can look forward," he remarked as he proposed the toast of the College. Lord Moran, the President, had to alter the order of the toast list "as the Government exerted their right to speak last," and he proposed the guests in a sustained feat of oratory of a high order. Indeed the Prime Minister charged Lord Moran with teaching him the art of public speaking, and explained how, in retaliation, he had taught his physician how to cure pneumonia. "We get on very well together," said Mr. Churchill. Lord Moran dipped into the history of the College, compared the outlook of the leaders of medical and of military science, and contrasted the improved state of the patients in the medical wards of today with those of thirty years ago, thanks to penicillin, sulphonamides, insulin and liver extract. Mr. Churchill insisted that the discoveries of science must be the inheritance of all. A national health service, he thought, must stand on two arches: the general practitioners, and the hospitals with their staff and consultants. More consultants would be needed in the future, but there must be no dilution or lowering of standards of consulting work. The Colleges must play their great part. "We ask your aid," he said; "we invite your counsel." Earlier he had spoken of his diffidence in coming to the luncheon. "I am a surgeon," he remarked. He was happy to give an assurance that the patient he had been looking after for some years was no longer in mortal danger: but the restiveness and fretfulness of convalescence still required his personal attention. Of Mr. Churchill Lord Moran remarked that he spread abroad a sense of purpose and of direction which had given men hope when there was really none. His great achievement had been the moral preparation of the youth of a democracy for ordeal by battle. In my heart, said Lord Moran, I have come to think of him as invincible.

SHELTER LEG AGAIN

DURING the blitz period of 1940, before bunks were generally installed in the London shelters, there were many complaints of swollen legs in people who had spent the night in a deck-chair with its cross-bar pressing on the back of their thighs or popliteal vessels. Elderly obese women of sedentary habit were mostly, though not exclusively, affected. The appearances resembled those of acute cellulitis—simple œdema developing into a shiny red swelling with sometimes bullæ and superficial ulcers.[1] Thrombophlebitis was to be suspected when one leg was more swollen than the other. In most cases the condition cleared up quickly with rest in bed, though ulceration and thrombosis needed longer treatment. At that time Keith Simpson[2] reported 21 cases of pulmonary embolism examined at autopsy during September and October, 1940, in which death had taken place either in or soon after leaving an air-raid shelter. He ascribed these also to deck-chair thrombosis, and urged the authorities to expedite the provision of bunks. These seemed to be effective, for no more was heard of shelter leg, but now Dr. Graham-Bonnalie reports in our correspondence columns that he has seen several cases during the last two years in people who have slept in deck-chairs. In these cases swelling of the legs was accompanied by stiffness of the ankle-joints, simulating rheumatism, and the chronic lymphatic obstruction present did not respond to treatment. There has been some reduction in the number of bunks provided in the London tube shelters during the raidless period, but the authorities say[3] that this does not amount to more than 5%. If we are to expect a return of raids in the coming months elderly people should be urged to use bunks, and shelter marshals might warn them that they are running a risk of shelter leg if they prefer a deck-chair.

1. *Lancet*, 1940, ii, 722. 2. *Ibid*, p. 744.

BURNS AND THE LIVER

CRITICAL interest in methods of treatment of burns continues to grow and the experimentalist is now turning his attention to remedies which at some time or other have been as much favoured as tannic acid. Hartman and Romence[4] draw attention to histological changes in the livers of severely burnt animals in the absence of treatment with tannic acid or other coagulants. These changes, they admit, are relatively slight—in fact many pathologists would hesitate to attribute much importance to such variable features as Hartman and Romence describe; but with infection they may assume a grimmer aspect and include actual necrosis of liver cells. When coagulating agents such as tannic acid, silver nitrate and ferric chloride are used as dressings for a burnt or denuded area, or are introduced by subcutaneous injection, liver damage increases and may be very severe. Tannic acid used as a wet dressing for burns produced jaundice in 12% of Hartman and Romence's dogs, and central necrosis of the liver in 16·5%. Dry tanning gave a much smaller incidence of liver necrosis. Silver nitrate in 2–10% aqueous solutions when injected subcutaneously caused extensive necrosis and œdema at the site of injection, with some degeneration, hæmorrhage and necrosis of the liver, but it was doubtful whether death could be attributed to these lesions. Ferric chloride in 5–10% aqueous solution injected subcutaneously also induced local necrosis, œdema and hæmorrhage; jaundice developed and liver damage was sometimes severe. In one animal with a wet dressing of ferric chloride on a burn occupying 60% of its body surface, death occurred on the 8th day and the liver was necrosed. Other protein coagulants such as alum and sulphosalicylic acid apparently had little effect on the liver when injected subcutaneously, but zinc peroxide gave rise to jaundice and at times severe liver necrosis. Admittedly, conclusions drawn from subcutaneous injections are not necessarily applicable to the treatment of a burnt surface, but they do call for thought as to whether such a method is the best to be adopted.

Another study of tannic acid confirms conclusions reached in America and this country. Baker and Handler[5] show that whereas subcutaneous injection of tannic acid into rats and mice results in death and hepatic necrosis, gallic acid produces no such changes. Washing a denuded skin area with tannic acid also had similar results, while ointments were almost as potent. These workers emphasise that necrosis of viable tissue over the denuded areas may occur with 10% tannic acid and regularly when concentrations greater than 10% are employed. There seems little doubt now about the experimental facts concerning the toxicity of tannic acid. A pronouncement by clinicians is still awaited.

The investigation described by Rae and Wilkinson in our present issue shows the need for further clinical research. Consideration of the possible causes of toxæmia in young children suffering from burns led Wilson to study in 1938 the toxic effects of tannic acid and later of other coagulants. At the Royal Hospital for Sick Children, Edinburgh, substitution of silver nitrate for tannic acid was followed by disappearance of

3. *News Chronicle*, Feb. 29, 1944, p. 3.
4. Hartman, F. W. and Romence, H. L. *Ann. Surg.* 1943, 118, 402.
5. Baker, R. D. and Handler, P. *Ibid*, 1943, 118, 417.

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acute toxæmia, and liver necrosis was not seen in any fatal case. Rae and Wilkinson, at the same hospital, have examined by the lævulose-tolerance test the liver function of 27 children, aged twelve years or less, suffering from burns and scalds. Of these, 12, with an average burn of 18% of the body surface, were treated with 2% gentian-violet followed by 10% silver nitrate; 7, with an average burn of 5% body surface, with sulphacetamide paste; and 8, burnt to an extent of 5% body surface, with tannic acid jelly. Impairment of liver function, which was found between the 3rd and 6th days, was least with treatment by gentian-violet and silver nitrate (despite the more extensive burning in these cases), and was most common and severe with tannic acid; sulphacetamide paste occupied an intermediate position. The investigators conclude that there is now enough evidence, both clinical and experimental, to justify disuse of tannic acid as a local application for burns. Nevertheless, much can still be said for coagulation treatment, and silver nitrate merits special consideration here.

A word of caution about sulphonamide drugs is timely. Some at least of these are rapidly absorbed from raw burnt surfaces and produce well-known systemic effects. Rae and Wilkinson now point out that liver damage may also develop from this cause and so add to the hazards of large burns.

"DUE INQUIRY"

A DISCIPLINARY inquiry, begun more than two years ago, ended on Friday evening, March 3, with a decision by the General Medical Council not to erase the defendant's name from the Register. Dr. E. D. Spackman first appeared before the council in November, 1941, on a charge of infamous conduct in a professional respect, after having been cited as co-respondent in the Divorce Court in the previous February and found guilty of adultery. The council, on the advice of its legal assessor, refused leave to call evidence that had not been before the Divorce Court, and found adultery proved with a married woman with whom the defendant stood in professional relationship. Dr. Spackman appealed against erasure and the case was finally taken to the House of Lords, which ruled in August last[1] that the council did not make "due inquiry," as required in section 29 of the Medical Act, by merely accepting the findings of the Divorce Court while refusing to hear evidence tendered to establish that those findings were wrong. The Lord Chancellor emphasised the statutory distinction between a conviction for crime, which the practitioner cannot challenge, and the issue of infamous conduct, where the council must make "due inquiry" before finding the practitioner guilty. The ruling, he said, applied not only to divorce proceedings but, for example, to a jury's verdict of justification in a slander suit, judgment for the plaintiff in an action for seduction, or a bastardy order made by the magistrates. The House of Lords referred the case back to the GMC for reconsideration. At the re-hearing on March 1, Dr. Spackman brought forward evidence to show that on many occasions when he was alleged to have been with the woman he was in fact elsewhere. He maintained that his association with her was innocent and well known to the husband, and he denied adultery or improper conduct. The council nevertheless again found the charge of adultery proved to their satisfaction, and there had been no denial of professional relationship. The President announced that the council therefore judged Dr. Spackman guilty of infamous conduct in a professional respect, but they were not directing the registrar to erase his name. "The Council," he told the defendant, "are anxious that their judgment in this case should not be misinterpreted. They have taken this course in view of the fact that your name was erased from the Register over two years ago, and that so far as the council is aware your conduct since that time has been irreproachable. But their action must not be construed as in any way condoning a grave professional offence, which strikes at the root of the confidence which the public must be able to repose in the medical profession."

1. See *Lancet*, 1943, ii, 201.

PENICILLIN IN GONORRHŒA

GONORRHŒA resistant to sulphonamides seems to be on the increase, but fortunately these cases are responding well to penicillin. In Tunisia, Priest[1] treated 9 Service cases, all of which had failed to respond to adequate sulphonamide therapy, and one further case which had had no previous treatment. Sodium penicillin was given intramuscularly in doses of 15,000 Oxford units every four hours for 11 or 12 doses. He reports that "In all cases the improvement was dramatic, like turning off a tap." Cook and his colleagues[2] report equally good results in another 14 sulphonamide-resistant cases. All of the 11 male patients gave negative cultures between 14 and 48 hours after beginning penicillin treatment. The 3 female cases, resistant to adequate sulphonamide therapy, were all complicated by extensive pelvic inflammatory disease, and one in addition had gonococcal proctitis. In Cook's cases, penicillin was given by the intravenous drip method, half the daily dose dissolved in a litre of normal saline being given morning and evening at a rate of 30 or 40 drops per minute. The maximum and minimum total doses were 110,000 and 65,000 (males) and 162,000 and 113,000 (females) Oxford units. In another American series,[3] 72 out of 75 men with sulphonamide-resistant gonorrhœa obtained clinical and bacteriological cure; the penicillin was given intramuscularly in 16 doses of 10,000 units, at three-hourly intervals. The other 3 cases comprised one in which urethritis recurred eight days after the patient had become symptom free and reinfection could not be excluded; one in which epididymitis developed a fortnight after discharge from hospital; and one whose status could not be established at the time of the report. The assessment of cure was based on the absence of clinical signs and negative urethral and prostatic cultures. These reports, and some unpublished records in this country, suggest that penicillin is the most effective drug for gonorrhœa yet tried. The organisms are rapidly eliminated, although a scanty mucopurulent urethral discharge usually remains for two to four days while the urethral mucosa returns to normal. Gentle irrigation accelerates this urethral rehabilitation. No toxic effects have been reported, and the frequent intramuscular injections are well tolerated by the gluteal muscles. Intravenous drip administration saves the discomfort of repeated needle punctures but immobilises the patient during treatment. The minimum effective dosage has yet to be determined but it is probable that 5000 units intramuscularly every three hours for 6–8 injections will prove adequate. It seems certain that, as supplies become available, penicillin will be the treatment of choice in sulphonamide-resistant cases to the exclusion of present methods of fever-chemotherapy. Time can be saved if such cases can be identified in the laboratory before treatment is begun, and various methods of identifying sulphonamide-resistant strains of gonococci, based on Fleming's technique,[4] are now in use. Goodale and his colleagues[5] in Boston employ a method which can be carried out in any clinical laboratory in 2–4 days, or less if the pus is inoculated directly on "sulphonamide" plates, and will predict the results of sulphon-

1. Priest, W. H. D. Penicillin. Preliminary Report to the War Office and Medical Research Council. 1943, p. 105.
2. Cook, E. N., Pool, T. L. and Herrell, W. E. *Proc. Mayo Clin.* 1943, **18**, 433.
3. Mahoney, J. F., Ferguson, C., Buchholtz, M. and Van Slyke, C. J. *Amer. J. Syph.* 1943, **27**, 525.
4. Fleming, A. *Proc. R. Soc. Med.* 1940–41, **34**, 342. See Francis, A. E. *Lancet*, 1942, i, 408. Petro, J. *Ibid*, 1943, i, 35.
5. Goodale, W. T., Gould, R. G., Schwab, L. and Winter, V. G. *J. Amer. med. Ass.* 1943, **123**, 547.

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amide therapy with a high degree of accuracy. But caution is needed in the interpretation of in-vitro tests for sulphonamide-sensitivity, using ordinary nutrient media, since the medium may contain a sulphonamide-inhibitory substance. Heavy inoculation of the test organism may also give a false result. It is advisable to use as controls strains known to be sensitive or resistant to sulphonamides.

MEDICAL CO-EDUCATION

MEN and women should have equal opportunity to enter medicine. The senate of London University have acted on this sound principle in recommending that all London medical schools should be open on equal terms to the two sexes. No immediate action, however, is contemplated, and there will be time to consider whether it will in fact be best to make all the schools co-educational. It is understandable that the schools which are disinclined to take women should refuse to do so unless assured that their rivals are going to take them; and this is perhaps why the senate proposes that all schools should fare alike. But it would be a pity if this meant that in every school women formed a small minority. In London at present only about 12% of students are women, and much could be said against distributing them equally between the schools. In the British Isles as a whole, however, the proportion is about 22% and it will rise further. A minority of a quarter or more is not so much a minority as an integral part of the school: its members cannot be treated either as nuisances, on the one hand, or as charming curiosities on the other, and need feel themselves neither on the defensive nor the offensive. Their teachers helping them, men and women in a truly mixed school can learn to know themselves as complementary rather than competitive.

VAGINAL SMEARS IN UTERINE CANCER

THE chance of cure in cancer of the uterus and cervix is greatly enhanced by early diagnosis. Papanicolaou and Traut,[1] who for some years have been studying the cell content of vaginal smears in these conditions, have now published their experience in book form. They present many cases substantiating their claim that we have in this method a simple means of diagnosing malignant uterine disease before any lesion is demonstrable by curettage and biopsy. Stains dissolved in 95% alcohol are used, giving much greater transparency than the ordinary aqueous solutions and equally good colour differentiation. A high degree of skill is needed on the part of the microscopist to interpret details, and the method is only put forward as a preliminary or accessory to other means of diagnosis. In the hands of these observers the vaginal smear has revealed the presence of nearly all the malignant lesions of the cervix which could be detected clinically or by biopsy. In addition, it has revealed a group of early lesions which could not be seen and hence could not be subjected to tissue diagnosis. In only a few cases—4 out of 127 patients with demonstrable carcinomas of the cervix—was the diagnosis missed. This is good evidence that their criteria of malignancy are reliable and sufficiently characteristic to be of practical use.

Thus in a woman admitted to hospital with a diagnosis of myoma uteri vaginal smears showed typical squamous cell carcinoma, though there was no visible lesion in the cervix. Despite this report the surgeon decided to treat the patient for myoma only, by supravaginal hysterectomy. Meanwhile vaginal smears made after the operation continued to show the cancer cells in considerable numbers. Before discharge from hospital, 10 days after admission, a random biopsy of the cervix was made; fortunately it included the area of malignant change—a very early intradermal squamous carcinoma. Serial sections made subsequent to amputation of the stump showed one small area of malignant growth. Of 127 cases of cancer of the cervix studied by this method, 24 had been treated with radium and most of these showed a greatly diminished tendency to exfoliation. Smears showed atypical cells produced by radiation. Thus the method may prove useful not only in following the results of radiation therapy but also in the detection of recurrences. Treatment with œstrogens facilitates the recognition of malignant cells in the vaginal smear by reducing its leucocyte and erythrocyte content.

In general diagnosis of cancer of the fundus from smears presents greater difficulties than diagnosis of cervical cancer. Cells from cancer of the fundus may not be carried into the vagina in large numbers and may escape attention because of their smaller size and of slighter degree of differentiation; adenocarcinoma cells are not easy to distinguish from non-malignant endometrial cells. Great caution must therefore be used before smear findings can be taken as evidence of malignancy in these cases. Nevertheless, the fact that such a high incidence of correct interpretation was achieved—over 90% of a group of 58 cases—indicates that the shedding of the malignant cells in itself is a significant process. A patient who had had only slight vaginal bleeding on one occasion came to the clinic to have the possibility of cancer ruled out. Repeated vaginal smears showed unmistakable signs of cancer, but curettage gave negative results, then and a week later. Over 4 months weekly vaginal smears continued to show cancer cells and finally the woman insisted on removal of the uterus. In the cornua was a small submucous myoma which prevented the curette reaching the portion of uterus behind it, and in this inaccessible spot microscopy revealed a very early superficial adenocarcinoma.

Vaginal smears have been used with conspicuous success in cancer diagnosis by Meigs and his colleagues[2] who report results in 220 patients. In 63 of these cases two of the team made an independent examination of each slide and in no case did they disagree. Of 58 cases proved histologically to be suffering from uterine cancer, 56 were diagnosed in the first instance by the vaginal smear method. In each of the 2 cases in which smears were negative, only one smear was available for study—a reminder that one negative vaginal smear should never be taken as evidence of the absence of malignancy.

PETHIDINE AS A DANGEROUS DRUG

THE liability of pethidine to produce addiction has now been established beyond question, and we have already urged in these columns that the same restrictions should be applied to it as to morphine (*Lancet*, Feb. 5, 1944, p. 188). A case reported in the *Chemist and Druggist* of Feb. 19 (p. 188) strongly supports this view. The matron of a nursing-home was charged at the police-court with unlawfully obtaining gr. 305 of morphine. The case was adjourned for 3 months, and during this period the woman took pethidine instead, obtaining over 400 vials from local pharmacists. At the resumed hearing she was placed on probation for three years and ordered to go to a mental hospital as a voluntary patient for a year. The police surgeon asked the bench to support an application he had made to the Home Secretary that pethidine should be placed under the Dangerous Drugs Act as soon as possible. In an editorial the *Chemist and Druggist* points out that a difficulty arises from the fact that the dangerous drugs legislation is essentially international, but suggests that the drug should be included among Schedule 4 poisons under the Pharmacy and Poisons Act, 1933.

1. A New Contribution to the Diagnosis of Uterine Cancer. G. N. Papanicolaou, MD, PH D; H. F. Traut, MD. Oxford University Press. Pp. 46. 11 plates. 28s.

2. Meigs, J. V., Graham, R. M., Fremont-Smith, M., Kapnick, I. and Rawson, R. W. *Surg. Gynec. Obstet.* 1943, 77, 449.

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Special Articles

PREMIER AND PHYSICIANS

Mr. CHURCHILL replied to Lord MORAN'S toast of the guests at the luncheon given at the Royal College of Physicians at the Savoy Hotel on Thursday of last week.

Lord Moran said:

The foundation of the Royal College of Physicians by Henry VIII in 1518 created medicine as a profession. Henry in his high Tudor tones decreed in his Charter that "no person from henceforth be suffered to exercise or practise in physic through England until such time as he be examined at London by the said President and three of the said Elects." The Stuarts were as favourably disposed to the College as the Tudors had been and an appeal on technical grounds against the College was summarily dismissed by the Lord Chief Justice who thereupon was entertained by the College to dinner in recognition of his fairness and impartiality. For three and a half centuries the College was consulted by the Crown on all sorts of occasions. There was no County Council, no local government, no Ministry of Health, there was no other body between the Government and the profession—the College was a pillar of the State.

HIS PREDECESSORS

The annals of the College have been kept from its earliest days and they testify to the independence of my predecessors. William III summoned Dr. Radcliffe, whose name is still honoured in Oxford, and showed him his great dropsical legs beneath his wasted frame. "What make of you these?" he demanded, "Truly, sir," Radcliffe answered, "I would not have Your Majesty's two legs for all your three Kingdoms," after which freedom the King did not trouble Dr. Radcliffe again for his opinion. But when Anne came to the Throne she summoned Dr. Radcliffe and presently we find him sending her word that her ailments were nothing but the vapours so that he refused to see her. The mob, hearing of his action, were greatly incensed and for some time he went about in fear of his life. Seventeen years later, in 1722, Friend—a fellow of the College—was imprisoned in the Tower for his religious conviction and Dr. Meade, who was then looking after Robert Walpole, the Prime Minister, refused to prescribe for him until Friend was set at liberty, which was done. I sometimes think rather wistfully of Dr. Meade's procedure. I suspect that the Prime Minister in the course of his devotion to the classics at Harrow, of which he has told us, came under the influence of Marcus Aurelius. The Emperor had plainly been very badly brought up by his doctor, Galen, for he said "If you are sick don't give doctors a chance to make an ado, but let life go on merrily and well."

AND THEIR TRAVELS

I was under the impression that my wanderings were a new chapter in the long history of the College but the annals are full of the travels of my predecessors—to the Court of France, to the Low Countries and to Spain. Henry Atkins, who had asked to be excused from accepting the first baronetcy created in 1579, accompanied Essex on his naval expedition to Spain, but he was so sea-sick that he was put ashore at Plymouth, whereupon Queen Elizabeth commanded the College to send a more seaworthy physician to the expedition. Harvey, the discoverer of the circulation, went everywhere with Charles I and we find him sitting under a hedge at the Battle of Edgehill reading a book, and when a cannon ball came near he only moved up the hedge. Many of these physicians were deeply versed in human nature and were themselves sent as the heads of missions. In 1672 Finch went to Constantinople as ambassador.

PROFESSIONS COMPARED

It is perhaps inevitable that having spent so many hours in the ante-chamber of Councils of War I have come to compare the profession of medicine and the profession of arms. Progress in both professions has always come by jumps punctuated by long periods of stagnation. Before the discovery of anæsthetics surgery was confined to a few operations carried out at great speed while the victim was forcibly held down: for centuries the barber surgeon was content to cut for stone, then at a stroke the use of chloroform and ether opened the whole body to the surgeon's knife. Likewise, in the soldier's craft, after a great stretch of time during which the subaltern was brought up on the campaigns of the great captains, there came the liberating moment when the appearance of the internal combustion engine, comparable to the discovery of anæsthetics, quite altered war.

In comparing the professions one asks whether the same qualities are needed in both. For some years now I have come much into contact with soldiers and as a doctor I see no reason to believe that the scientific mind is more common in my calling than in the Army. At any rate that is true if I am speaking of practising physicians and surgeons. I hasten to add that qualification, for there are half a dozen creative minds in the profession of medicine who have no counterpart in the army—Sherrington, Adrian, Dale, Gowland Hopkins, Thomas Lewis, Almroth Wright, all fellows of our College. There is too no machinery in that service like the Medical Research Council for the discovery of men with the creative instinct at the outset of their careers. Such men would carry out research into tactics and weapons—for example, the limitations of the anti-tank rifle would have been laid down before it was used in battle. But I am not sure if the conditions of the two professions are strictly comparable. I doubt whether the direction of armies in war calls for the creative instinct in the same measure as does research into the origin of disease. And these doubts are strengthened by a conversation with General Smuts at Cairo in the summer of 1942. I had been talking to him of the appraising, measuring mind, of the value of judgment. He accepted this but went on to speak of the supremacy of the man of ideas. "Men of action," he said, "live on the surface of things, they do not create." Smuts, if he had been born in Germany, might have been one of the great captains of war. He collects his facts like a man of science—listening, sifting, rejecting what has not been proved. No other soldier that I know has quite the same approach to evidence.

There is one other qualification I must make. I am bound to ask if the conditions of the soldier's life and training are friendly to the development of the scientific mind. Discipline does not foster independence of thought, while life in a regimental mess hardly encourages these habits of reflexion that are only bred in solitude. Further there is the fetish, not confined to soldiers, that the mind works best when the body is exhausted by exercise.

STAYING POWER

There is one quality which both callings need. The first and the last essential of an efficient soldier is character; without it he will not long endure the perils of modern war. Even in the last war the durability of a general—his survival value—seemed to depend more on character than on capacity. We may doubt the pre-eminence of Foch, Haig, Jellicoe and Trenchard in their art, but as men they came from the old mould of their race. They wore well, they were built for great occasions. In the fundamental clash between great nations, when their existence is at stake, the issue is determined by moral and not by intellectual factors. The part that character plays in medical diagnosis is not always appreciated. It is the quality which allows judgment to be exercised irrespective of worldly considerations which may snare the feet of the lighter breed of doctor.

I end my comparison with a paradox. The successful doctor sees a stranger almost every hour of the day and he must not only find out what is wrong with him but must learn to gauge his temperament and his outlook, what he wants to know and whether he is going to do what you tell him; and so the physician after 30 or 40 years becomes an expert judge of men. But he cannot use it in devoluting his work. He must exercise his lonely art as an individual. Now the soldier who has not the art of selecting his subordinates is lost, but it is the paradox of the situation that, unlike the physician, he gets few opportunities in peace-time of practising this art. Even individual criticism is discouraged in the mess.

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THE SECRET OF LEADERSHIP

Aristotle believed that a physician had opportunities of studying human nature given to no-one else; a philosopher, he said, ought to begin life as a physician, and a physician should end his life as a philosopher. I shall not make use of what I have learnt in welcoming our guests in turn, but I want to say a few words about the first of our guests, the Prime Minister. I shall not go over again those of his virtues which have caught the breath of the world, but I shall try to measure his contribution to victory by attempting to define more precisely than has been done the exact nature of his task. That task as I see it is the moral preparation of the youth of England for ordeal by battle. "If these English had any apprehension they would run away"; that was what Shakespeare said of our soldiers at Agincourt. Five centuries have passed and the insensitive straw-chewing yokel soldier has gradually changed into the imaginative citizen soldier of the democratic armies of today. It was of this man Thomas Hardy wrote "More life trickles out through a man's thoughts than through a gaping wound." This is the problem that confronts the leader of a democracy. If he can find no solution he sends his armies limping into war.

He cannot solve his problem in the way our enemies do. The German soldier is stiffened by a pride in arms; when he joins the army he joins a sacred fellowship, he is envied by his fellows. The Guards and the Navy have this pride in arms, but it cannot be transferred to a citizen army in a few months' training. How then can it be done? That is a story for another day. But perhaps I may say this: the art of command is the art of impressing the imagination. When the surge and thunder of the Prime Minister's vast vocabulary are heard no more, history will recount how he spread abroad a sense of purpose and direction which gave men hope, when there was really none. More than once I have been with him when news of shattering reverses was brought to him and in my heart I have come to think of him as invincible.

I see President Roosevelt singing carols on Christmas Day, care-free as a boy; I see Stalin drawing wolves with a fat red pencil while he listens to the English case; but this is the picture I would like to leave with you of the Prime Minister. A battalion of the Coldstreams was drilling before him and as he watched the perfect rhythm of their movements his eyes filled with tears. If you can understand that surge of feeling, can feel what he felt, you have got to the heart of the making of soldiers and it was his success in this making of soldiers and sailors and airmen which has stood between us and the utter ruin of our cause through all these anxious years.

Mr. Churchill said:

I am very grateful to my cherished friend, Lord Moran, for the kind expressions he has used about me and about the conclusions which his naturally close and intimate investigations have enabled him to form (*Laughter*). He has been my companion on the various journeys I have had to take in the course of public business about the world during this war, and always a devoted and comforting friend. We get on very well together (*Laughter*). As you can see from the excellent speech to which you have just listened, we divide our labours; he instructs me in the art of public speaking, and I teach him how to cure pneumonia (*Laughter*). But close as our relations are, I must confess that it was not without compunction and even misgiving that I accepted his hospitable invitation today. I do not profess to be very deeply acquainted with the science of medicine. I am a surgeon myself (*Laughter*). But my experiences in medicine have been vivid and violent, and completely absorbing while they were going on (*Laughter*). Nevertheless I cannot claim that they have given me that broad detached general experience which, I believe, is the foundation of all correct scientific action. Moreover, to address so distinguished a company on topics with which one is necessarily not profoundly acquainted is an ordeal. But the most serious part of my misgivings arose from the fact that I should have to leave my patient for a while. I have a patient whom I have been looking after for some years, as you may know, and I am glad to be able to assure you that she is no longer in mortal danger (*Applause*); on that I can give you an absolute assurance. You must not suppose that this has in any way reduced my work; on the contrary, now that the greatest danger is passed, my patient has reached a stage where restiveness, fretfulness, the impatience of convalescence, the weariness of a long prolongation of the disease, while they do not excite the same anxiety in one's breast, nevertheless require a very full measure of one's personal attention (*Applause*).

THE GOVERNMENT'S COURSE

The recent advances in medicine are most remarkable and inspiring. Human inventiveness has been fanned by the fierce wings of war. New drugs of a remarkable, healing potency are becoming commonplaces of science, and even the latest textbooks on many diseases require to have very considerable annotations and additions made to them. I personally have never failed to pay my tribute of respect and gratitude to M & B; although I am not competent to give you an exact description of how it works, it certainly has in my case always been attended by highly beneficial results. Then there is penicillin, which has broken upon the world just at a moment when human beings are being gashed, and torn, and poisoned by wounds on the field of war in enormous numbers, and when so many other diseases, hitherto insoluble, cry for treatment. It is a great satisfaction to be able to congratulate St. Mary's Hospital on their association with penicillin (*Applause*).

The discoveries of healing science must be the inheritance of all. That is clear. Disease must be attacked whether it occurs in the poorest or the richest man or woman, simply on the ground that it is the enemy; and it must be attacked just in the same way as the fire brigade will give its full assistance to the humble cottage as readily as it will give it to the most important mansion. HM Government have adopted the policy outlined in the remarks of Lord Beaconsfield (Health and the laws of health), and that is the course upon which we have embarked. Our policy is to create a National Health Service in order to ensure that everybody in the country, irrespective of means, age, sex or occupation, shall have equal opportunities to benefit from the best and most up-to-date medical and allied services available.

The plan that we have put forward is a very large-scale plan, and in ordinary times of peace would rivet and dominate the attention of the whole country, but even during this war it deserves the close study and thought of all who can spare themselves from other duties for that purpose. It is not a rigid or arbitrary plan. We welcome constructive criticism, we claim the loyal and active aid of the whole medical profession (*Applause*). Any health service must rest on two arches: the first, the General Practitioner, the rank and file of the profession; the second, the Hospital Service, depending upon the staffs of the hospitals, sustained and guided by the Consultants. The fact that many more consultants will be needed in the future than there are now must not result in dilution or in the lowering of the standard of consultant work. There is a new gap to be filled, and it is essential that in this new effort the Colleges should play their great part. We ask your aid. We invite your counsel. Together these vast problems may take a forward move which will be notable and permanent in its effects long after the roar of the cannonade has died away.

We have today announced the names of the Royal Commission on Population. There is no branch of human knowledge in which we can pierce the mysteries of the future so clearly as in the trend of population. Here you have prophecies which rest on certainty; here the searchlight of statistics ranges with accuracy for thirty or forty years ahead. The destiny of our country, which after all has rendered notable services to mankind in peace and latterly in war, depends upon an ever flowing foundation of healthy children, born into what we trust will be a broader society and a less distracted world. Science, now so largely perverted to destruction, must raise its glittering shield not only over the children but over the mothers, not only over the family but over the home. In all this field again you must be active. Your services will be given with devotion, and your voice will be heard with respect.

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IN PRAISE OF TRADITION

This College, on whose past you, Lord Moran, have descanted, on whose past you have opened some windows which cast a view upon its former glories, was, I am assured, founded by a man of wide experience of human nature—and of both sexes (*Laughter*)—King Henry VIII, in 1518. It is claimed that he thus created medicine as a profession and cast a stern Tudor frown upon quackery of all kinds. However, my Lord, the Ministry of Health are of opinion that the suppression of quackery dates not from 1518 but from the Medical Act of 1858 (*Laughter*). I would not for worlds plunge into a new controversy in a world which is already sufficiently filled with strife, but certainly this College was famous, and its career was remarkable, for many long periods of history, during some of which it has been a veritable pillar of the State. Certainly, if appeal is made to antiquity, the honours rest with the Royal College of Physicians. The Ministry of Health, I remember well, is quite a newcomer in the field, for I can recollect myself having at one time been offered by Mr. Asquith the Local Government Board—it sounds a very modest affair (*Laughter*)—carrying with it only a salary of £2000 a year as a minor Minister, but which has now blossomed out quite recently into the full-blown majesty of the Ministry of Health.

As between the old and the new you have undoubtedly the advantage of antiquity. This College must play its part in keeping alive the historic tradition of the medical profession, and must ever foster those high standards of professional behaviour which distinguish a profession from a trade. This is what you have tried to do as an institution for nearly four hundred years. I confess myself to be a great admirer of tradition. The longer you can look back, the farther you can look forward. This is not a philosophical or political argument—any oculist will tell you this is true (*Laughter*). The wider the span, the longer the continuity, the greater is the sense of duty in individual men and women, each contributing their brief life's work to the preservation and progress of the land in which they live, of the society of which they are members, and the world of which they are the servants.

With these few thoughts—or remarks, for I would not rate them too high—I will invite this great company, and with no apprehension of refusal on your part, to drink the health of the Royal College of Physicians, and to wish them all Prosperity and Success in the great part they have to play in the unfolding evolution of our nation (*Great applause*).

CANADA

LIBRARY and Historical Night is an annual affair in the Academy of Medicine of Toronto. Fellows of the academy are invited to bring their wives or interested friends, so the meeting is in part a social affair. After reports from the library committee and the historical and museum committee, a paper is read, often by a guest from another city, and the company then adjourns to the reading-room to take refreshments and inspect a special exhibit suitable to the subject discussed.

This year there were two papers. Dr. F. A. Clarkson reviewed the life of Dr. Jabez Elliott who died last year. Dr. Elliott was professor of history of medicine in the University of Toronto and it is to his knowledge of medical literature and his zeal in finding rare books that the academy owes a valuable collection. Garrison lists 45 texts essential to the understanding of medicine in the 17th century: the academy has 26 of them. The Eden edition of Harvey, once advertised in a sale in London as one of 14 copies known to exist, is a treasure in this section; Dr. Elliott knew where it was to be found, and waited 10 years to acquire it as a gift. A plaque of Dr. Elliott was unveiled at the meeting.

Dr. E. A. McCulloch discussed Howard Kelly and the founding of the medical school in Johns Hopkins.

The museum would be lost in the Wellcome Museum in London, but has some valuable items. There is a large collection of Osleriana, including the microscope of Father Johnson which was used by Osler in his early study of diatoms. A collection of engravings of famous physicians was presented by Sir Edmund Osler.

The Medical History Club of Toronto is limited to 14 members so that meetings may be held in private homes. It does not publish its proceedings and is thus less enterprising than the group in Calgary, Alberta, which meets once a month and distributes a bulletin to many interested people throughout Canada. Much valuable material, especially about pioneer medical men, is thus preserved.

No appointment has been made to the chair of history of medicine in Toronto University. The retiring age for professors is 65, and serious interest in the subject is seldom found in younger men who are generally too busy to indulge such a taste until leisure is compelled by seniority.

* * *

The New Year's honours list contains the names of two Canadian medical men. Prof. Duncan Graham and Surgeon Commander C. H. Best have been awarded the CBE. Commander Best, professor of physiology in the university, is recognised for his work on nutrition in the Royal Canadian Navy and for other research into the needs of the Armed Forces. Professor Graham has held the chair of medicine in the university for 25 years and has inspired and led a brilliant staff in clinical research. For the first two years of the war he was adviser to the government in matters of organisation of medical services. He is a past president of the Canadian Medical Association. The government of the United States have done posthumous honour to Sir Frederick Banting by naming one of the new Liberty ships for him. At the launching Lady Banting, now a private in the CWAC and a fifth-year student in medicine, performed the christening ceremony in Baltimore. This is the first time in history that the name of a Canadian has been used as designation for an American ship.

* * *

The Minister of Health in Ontario is introducing a bill to provide free hospital care and diagnostic aid to every one in the province. The cost is to be met by a tax on all persons 17 years of age and over. Any deficit will be paid out of consolidated revenue. Heretofore municipalities were responsible for hospital costs of their own indigents to the extent of $1.75 daily with the government supplementing this by 50 cents. The Federal Health Bill will probably be presented to Parliament during the present session and then the legislatures of the provinces will have a guide in evolving wider schemes. In this country the vested interests of friendly societies are too small to count.

DISTRICT NURSING

THE Rushcliffe scale has raised the salaries of district nurses in many areas, though some London nursing associations have always paid their members so well (relatively speaking) that little increase has been necessary. For others, as was pointed out at the recent annual meeting of the Central Council for District Nursing, the cost will be a heavy burden, even though half of it is refunded through the local authorities. More district nurses have been applying for analgesic bursaries for training in the use of the gas-and-air inhaler during childbirth, and associations have made an effort to release them for the period of the course. A popular account of the service which district nurses render to the community (*Queen's Nurses—and what they do*) has been issued by the Queen's Institute (57, Lower Belgrave Street, S.W., 6*d.*). It provides a clear and kindly reply to the man who said of the district nurse: "I know she is always available, always there, but who provides her and looks after her I have never discovered." The well-illustrated little brochure reviews the founding of the institute and its history, and gives some idea of the vigorous, friendly and self-reliant women who look after our sick in their own homes, not only under the busy conditions of peace, but under the busier and more exacting conditions imposed by the air attacks of war.

THE series of articles on vitamins which appeared in the *Pharmaceutical Journal* in 1938–39 were reprinted in a booklet which has now been thoroughly revised. Though primarily intended for pharmacists it is detailed and reliable enough for the doctor's bookshelf. In particular it contains useful tables of the vitamin contents of official and commercial preparations. Obtainable from the Pharmaceutical Press, 17, Bloomsbury Square, W.C.1, price 2*s.* 6*d.* post free.

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Reconstruction

THE WHITE PAPER REVIEWED

II. By an Insurance Committee Secretary

INSURANCE committees had no place in the first draft of the National Insurance Bill of 1911. They were instituted to meet the objection of medical practitioners to taking service directly under the control of approved societies. The constitution of insurance committees provided, however, for a majority of representatives of insured persons, and this in effect means nominees of approved societies. The National Health Insurance Act, 1936, provides that three-fifths of the members of insurance committees are to be representatives of insured persons; one-fifth are appointed by the county or county-borough council; two members are appointed by the local medical committee for the county or county borough; one member must be a medical practitioner appointed by the county or county-borough council, and the remaining members are appointed by the Minister of Health.

The Royal Commission of 1926, after paying a tribute to the work of insurance committees, recommended their abolition; but they have survived a further 18 years and have endeavoured throughout that period to secure improvement in the content of medical benefit under the Insurance Acts. Most of the improvements for which they have been striving are forecast in the white-paper, but the Government seems to have decided that the committees themselves shall be abolished. Like King Charles II they have been an unconscionable time a-dying; but, unlike him, they need make no apology to the medical profession on that account.

STORY OF MEDICAL BENEFIT

Medical benefit has comprised treatment by practitioners and the supply of drugs and prescribed appliances by pharmacists. The range of medical treatment is defined as comprising all proper and necessary medical services other than those involving the application of special skill and experience of a degree or kind which general practitioners as a class cannot reasonably be expected to possess. In short, insured persons have been entitled under the National Health Insurance Acts to general-practitioner treatment and nothing more, and for many years insurance committees have been pressing for the extension of this form of treatment so as to cover consultant services, pathological and diagnostic facilities and the like. Blood-counts, radiography, ultraviolet ray therapy and many other forms of modern technique have been regarded as outside the scope of medical benefit, and unless the patient has been able to obtain them through a hospital their cost has often caused him concern. Under the comprehensive service described in the white-paper the limitations hitherto in force will be abolished, and from the national point of view this is all to the good.

It may be of interest to look back to the inception of NHI and remind ourselves of the way in which medical benefit has become available to different sections of the community during the last 32 years. Originally the act applied to all manual workers and to non-manual workers earning not more than £160 a year. Some years later the income limit was raised to £250 a year, and in 1942 it became £420 a year. This last increase brought certain objections from the medical profession, mainly because a new section of the community had been brought within the scope of free treatment under the act without prior consultation with the medical profession; but despite the objections there was very little friction so far as doctors and patients were concerned. The war, too, has had the effect of bringing into insurable employment many people who but for war-time employment would never have become insured, and today by far the majority of the adult population are insured persons. This has had its repercussions in the relationship between doctor and patient. In 1913 the insured person was usually a "working man" or a "working woman." But of late years the black-coated worker has been brought in, and any lingering savour of a "development of the old club practice" has now been jettisoned. Thus the new National Health Service, in whatever form it may eventually be brought into operation, will start with the immense advantage that treatment under the National Health Insurance Acts has become the rule rather than the exception.

AWKWARD PROBLEMS

There will doubtless be many adjustments of the ideas put forward in the white-paper; but one point on which a little disquiet may be felt is the provision whereby practitioners may become participants in the new service and remain "private doctors" as before. Experience over the years shows that in many cases the insured patient of Dr. A. who obtains treatment from Dr. B. thinks he is getting much better service thereby, while the insured patient of Dr. B. is equally sure that the private treatment given by Dr. A. is just what he needs. The new service is to be available for all—there will be no question of title to benefit having ceased—and perhaps it would be better that practitioners who enter the scheme should not be permitted to provide treatment privately for persons entitled to treatment free under the scheme.

Another question that will need attention relates to certification. The white-paper deals with medical treatment as treatment, and the fate of approved societies and the administration of monetary payments in cases of sickness are to be dealt with under separate social insurance legislation. But the very definite link between the two is the medical certificate, which is issued as part of treatment. On page 26 of the white-paper it is pointed out that "the method of embodying general medical practice in a national service must observe two principles. The first, which mainly concerns the patient, is that people must be able to choose for themselves the doctor from whom they wish to seek their medical advice and treatment, and to change to another doctor if they so wish. Freedom of choice is not absolute now; it depends on the number and accessibility of doctors and on the fact that there is a limit to the load which any one doctor can or should take on." The essential phrase here is "to change to another doctor if they so wish." Persons insured under NHI were for a time allowed to change their insurance practitioner at will, and some of them exercised that will pretty freely. I remember one gentleman who changed his doctor five times during one quarter. It was found that if a practitioner refused to issue a certificate of incapacity the patient would forthwith transfer to another practitioner who was perhaps less disinclined to issue such certificates, and when practitioners were accused of lax certification they pointed out that it was more or less a case of "issue the certificate or lose the patient and his family." Transfers at will were then abolished and the present system of transfer by consent, except in case of removal to another district, was instituted. Something of this sort will have to be devised in connexion with the new scheme.

FURTHER OUTLOOK UNSETTLED

So far as the administration of the new scheme is concerned there will doubtless be various opinions as to the apparent elimination of the contributors as such from the bodies administering the scheme. Admittedly the new Central Medical Board and its local committees will include lay representatives; but these apparently will be members of the local authority, and will of course be political appointees. Whether this is for good or ill time will show. Clearly medical representation is to be increased, and the objections which have been raised to the three-fifths majority of representatives of approved societies on insurance committees will no longer apply.

We insurance committee officers will watch with interest the development of the new service from the proposals set out in the white-paper, and can all hope that the result will be a healthier population. For ourselves, our occupation is to be abolished; but we assume that our experience with insurance committees over the past 30 years will not be entirely wasted and that some niche will be found for us in the new structure.

FACULTY OF RADIOLOGISTS.—At 10.30 AM, on Saturday, March 18, at 32, Welbeck Street, London, W.1, the radiotherapy section will discuss the influence of dose-rate in radiotherapy. Dr. L. H. Gray, Dr. R. McWhirter and Dr. G. C. Fairchild are to be the opening speakers.

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In England Now

A Running Commentary by Peripatetic Correspondents

Two ancient manor houses in a home county have wakened to new life in the last few years. One holds some forty children under five, the other nearly forty old people left homeless and uncared for after bombing. Those who have the care of these beginners and old hands find their tasks not so different as might be expected. Young and old alike need assurance of affection; both are easily made jealous by the suspicion that one member is favoured above the rest, both need someone to help them to keep clean and tidy, both like little treats. Food is a different matter. The old people are confirmed in the dietary habits of a life-time, which are kindly indulged. The children are being trained in habits based on newer teaching; when I saw them, tea began cleverly with rusks, cheese and raw cabbage, and went on to stewed fruit and cereal and long drinks of milk, with a bit of cake to crown the end. The old people had just had dinner: a big piece of fresh haddock, plenty of potatoes and leeks, and a fine solid apple pudding, in helpings big enough to immobilise a schoolboy. For them, the crown was a strong cup of tea. The children, little Londoners, nervous at first from war experience and malnourished by ill-chosen food, have become violently energetic after two years of good diet, regular life and country air. The old people are agreeably placid, "cushioned about in the kindly years between the wall and the fire." They help with little household tasks, making their own beds and dusting rooms, but doing no scrubbing, cooking, washing up or carrying of coals; those are done by a staff of four, two of each sex, who work like mothers of large families and live in the cold remote servants' quarters at the top of the old house. Steam heating and open fires keep the old people warm, and on sunny days they can sit in the fine garden which keeps them in vegetables, fruit and flowers all the year round.

One need which doesn't arise in the nursery school is acute in the senior establishment: chiropody. These old tender feet, with varicosed fragile skin, are beset with ills earned in a long working life—corns, bunions, onychogryphosis. The old skin proliferates in places, heaping dead cells about the nails and between the toes; these piles of sodden keratin make breeding-beds for micro-organisms, from which infection readily invades a crack or scratch; and poor circulation hinders healing. Skilled care of the feet should be assured for any group of old people living in a community. And it must be available to all of them: a corn slighted in favour of the urgent claims of another resident's bunion will inflict excruciating pangs on its affronted owner.

Tempers are surprisingly easy; the old people seldom fall out, and when they do, one handsome veteran told me, "it's all settled by a pinch of snuff." Not among the ladies, of course; but in any case they seem less inclined to tiffs than the old gentlemen. They are earlier risers, too, always being on time for breakfast at 8.15 AM, while the old gentlemen are apt to toddle down late. Wireless is a useful entertainer, but these town-dwellers miss the shops. Permission to use a car has come as a life-line, and a rota (in strict alphabetical order) has already been drawn up, on which each in turn will be taken to the nearest country town for a riotous visit to Woolworths.

* * *

The bandbox lid of the great hall in BMA house had a look of being closed with difficulty on the crammed contents, when Dr. Charles Hill, now newly appointed secretary to the association, spoke to the Metropolitan Counties branch about the white-paper last Sunday. With a stamina Ruth Draper might have envied, Dr. Hill conducted a one-man show from 2.30 until nearly 5 o'clock, speaking for well over an hour and then answering questions handed up to him. His good-humour never flagged, and his exposition was lucid and audible.

He began with the facts, running over the contents of the white-paper, and pointing out that the profession approved the ethical principles underlying it. Our business now, he thinks, is to consider it, and he was there to give a statement of immediate reactions. The Government are firmly attached to the idea of supplying full medical care to all who want it, without income limit. The "corporate body" proposed by the profession has not found favour, and he is not really surprised: the Government naturally want to be directly responsible for any body so intimately concerned with public welfare. But he regrets that the white-paper permits such scattered government control, distributed among several departments, including the Treasury: the "comprehensive" principle has not been given full scope at the centre. He pointed out that the Central Health Services Council which will advise the Minister is to be appointed by him, not elected by the medica profession; and it is not free to publish a separate report. The executive body, the Central Medical Board, is also to be appointed by the Minister; but it will be predominantly medical and will have some of the characteristics of a corporate body.

Only two points in the paper, however, seemed to be causing Dr. Hill any serious disquiet. First, he was disappointed in the type of health centre suggested. Four types are possible: the Dawson centre with beds; the diagnostic centre with full equipment for the purpose; the centre in which preventive and curative work are integrated; and the communal surgery. Of these, the last, the least advanced type, has been adopted in the white-paper, and he sees no evidence that there will be genuine experiment with other types. The public have taken very kindly to the idea of health centres, and if they are only to have what they have always had, they must be told so, he feels. His second grave suspicion was of this phrase in the white-paper:

> "The Board must also be able to require the young doctor during the early years of his career to give his full time to the public service where the needs of the service require this."

This rather vague proposal, coming among so much that is reasoned and reasonable, does seem to leave a loophole through which a "quasi-corporate body of civil service structure" could, over a period of years, insensibly introduce a whole-time salaried medical service under local-government control. As it is, Dr. Hill feels that the young man faced with buying a practice or going into the public service free will generally not hesitate, and the capital value of practices is going to fall. And what about this buying and selling of practices? Provided fair compensation is paid, would we be glad to see the custom disappear? He hopes to learn the answer from the questionnaire which the association is now preparing to send to the whole profession. He considers it a pity that the plan splits the profession up into groups: general practitioners in individual service; general practitioners in health centres; consultants in voluntary hospitals; consultants in municipal hospitals; and doctors in the public health service. And he is troubled for the fate of the voluntary hospitals which must, to keep their voluntary status, provide some funds themselves, yet which will now see the end of their contributory schemes. The profession must see to it, he said, that the hospitals are only required to find a suitable amount of money and that they are given a place in the administration of the new health scheme comparable to the services they have rendered.

Questions delivered up in writing have not the same piquancy as the spoken demand, but Dr. Hill managed to flavour them with his own personality. "Do you agree," one asked, "that the freedom of the doctor to remain outside the service is largely illusory?" "Well, of course I do," said Dr. Hill. In some areas, he added thoughtfully, one partner might care to remain outside. He said he was not making a suggestion.

* * *

My hospital is well in on "this rehabilitation ramp." For many years we have been massage-minded and during the first world war we turned out many CSMMG's, for whose services at the time there was a great demand though some found themselves out of employment in the subsequent slump. The next stage was our massage department, transformed in a separate building into a department of physical medicine, with apparatus and gadgets galore but nevertheless a decisive shift from passive to active movements. An occupational-therapy room followed and with it definitely

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arrived the rehabilitation motif. Although patients have been known to talk about their "occasional therapy," energy and application then became the watchwords. Now we have blossomed out in full flower as a rehabilitation unit with a staff of 12 trained physiotherapists, busy bodies who swarm out of the unit into the medical and surgical wards and put the patients through it, except those certified as not yet strong enough to be rehabilitated. This innovation was at first received with suspicion but now is welcomed. Sceptics there are still who suspect a racket to keep the p-t herself fit while ostensibly benefiting the patient. For immobile patients who find difficulty in attending the unit we have for three years past employed a van, which, complete with two p-t's and apparatus, carries the means of rehabilitation to their homes and villages. Organised games we have not attained, nor do we go in for log-splitting, or, as I trust your correspondent of Feb. 19 will believe, for log-rolling. Gardening we tried, but abandoned long ago. Results were too slow in showing—a man does not take interest in digging and sowing in order that others may reap—whereas in other forms of occupational therapy he has the double joy of overcoming his disability and producing something useful or ornamental, and sometimes both. My grandchildren and my dog are controlled by reins and leads thus produced, all I may add duly paid for. That is still another inducement—pocket-money—for our productions meet with a ready sale. Here let me pay proper tribute to the ministries who provide us with materials and with whom we work in close liaison as the work goes on and the man gets nearer and nearer to taking his place in the world again. For the ultimate aim is to make the man a man again for a' that.

Our completed unit was opened lately by an eminent physician. Before the function one patient confessed to the sister that he had not been very regular in his attendances, but "might I see the lord?" Such backsliders however are rare. Once the end and the means to the end are explained to them, patients work with a will. Few fall by the way, the vast majority seeing the thing through to the end; and pace your recent correspondent, the end nearly always justifies the means. Now and again a patient may threaten to become obsessed by his disability and his surroundings, but the staff are on the watch for that and a spot of psychotherapy is superadded. This is one small point which emphasises the fact that in rehabilitation there must be teamwork. Patient and physiotherapist must work together, pupil and teacher both putting their best efforts into the task. Results may be rapid, or success be slowly gained, but with both parties there must be the will to win and the physiotherapist's patient encouragement is needed as much as her professional skill.

We cannot offer my fellow peripatetic country surroundings, but we can and do offer him sea-air, and (sometimes) the blue skies of which he writes so feelingly. Let him accept the invitation and we shall be delighted to show him a hospital, and a voluntary one at that, which had found EMS Memo No. 6 "capable of immediate application" before it was issued. Our resources will be placed at his disposal to remove what he calls "the shreds of lassitude and depression" and we shall not ask him to swallow his every word.

Parliament

ON THE FLOOR OF THE HOUSE

MEDICUS MP

IT is only in this fifth year of the war that the Government is able to announce the setting up of an office of the International Red Cross in Shanghai, for which Parliament was asked to vote £3873. This will do something to help the many British civilians and the small number of prisoners who are there. It is hoped that this may be the first instalment of a wider application of Red Cross aid in the Eastern Theatre of war. The Japanese have up to the present allowed no access to the Philippines, to Malaya or to the Netherlands East Indies, and there have been no visits by the International Red Cross to camps in these or other occupied territories.

There is to be a debate next week on infantile mortality primarily arising out of the report on Infantile Mortality in Scotland but not to be confined to that country. In a short time there is to be a two-day debate on the white-paper on the medical services. So far there is only opposition on detail from any quarter of the House, though the local authorities may have something to say through their spokesmen when the debate comes forward. Many members consider that the grouping of voluntary and publicly controlled hospitals in the Emergency Medical Service has pointed the way to coöperation. The position of private nursing-homes will also need to be defined.

Sir James Grigg in introducing the Annual Army Estimates in token form had to paint on a big canvas the great achievements of the past twelve months. He had also to tell us of the acute man-power question, and how he retains in the Service men of category C who make up 6% of our Army.

Another 10% at any one time is represented by men sick, wounded or undergoing their initial training. He made no direct reference to the medical services, but the shortage applies to them also, and without his work of classification, rehabilitation and testing the man-power difficulties would be greater still. From a survey of the immediate past the Minister turned his attention to the postwar future. He drew a picture of a service attracting the best elements of the population, offering an honourable career to all classes of the community. And the "monetary rewards" must be sufficient.

The Army Estimates, like other estimates, provide the opportunity for debate on grievances moved in the form of an amendment to the main motion. So on this day, Mr. W. D. Kendall, Independent member for Grantham, moved an amendment on the pay and allowances of the soldier and asked for an increase. The theme of his speech was the need to bring the pay plus allowances of the soldier more nearly to the level of the pay of an ordinary industrial worker. Many speeches were made, at first in dulcet and persuasive tones as it was known that the War Office had been making a study of pay and allowances and it was hoped they would announce substantial increases.

The point was made, time and again, that the soldier's wife and dependent children are often suffering serious hardship. A claim was also put forward for an increase of the pay and allowances of junior officers up to the rank of captain. But when Sir James Grigg came to reply he was, at first, adamant in his refusal. He said that "increases of this order . . . and any adjustment of pay on that basis are outside the range of practical politics." The Minister suggested a private committee of members to discuss the matter—with increase of pay barred though not consideration of hardship. But the House would have none of it. Speeches took on a warmer tinge. There were more interjections. The Minister had to intervene to try and explain. Mr. Eden, as Leader of the House, came to the rescue time after time. And the temperature rose rapidly. Not one speech was made supporting the non-possumus attitude of the Minister. Interjections and what the Hansard reporters call [*Interruption*], which means a clamour which cannot be dissected into separate speeches or interjections, were common. Finally Mr. Eden had to give way and promise what will amount to a discussion on pay and allowances. But even that did not pacify the House. There were hurried conferences on the Government benches. Calls were sent out to absent members. MPs on Home Guard duty trooped in, and in the end the Government saved themselves from a defeat, which at one time seemed imminent, by the narrow margin of 63 votes to 40. What will come of the private discussions remains to be seen.

ROYAL COMMISSION ON POPULATION

On March 2 the Prime Minister announced the names of the members of the Royal Commission on Population and of the three committees which are to assist it on the statistical, economic, and biological and medical aspects of the inquiry. The Commission's terms of reference are: "To examine the facts relating to the present population trends in Great Britain; to investigate the causes of these trends and to consider their probable consequences;

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to consider what measures, if any, should be taken in the national interest to influence the future trend of population; and to make recommendations." Its members are:

Lord SIMON (chairman), Dr. ETHEL CASSIE, Lord CRANBROOK, Lady DOLLAN, Mr. R. C. K. ENSOR, Mr. J. R. HOBHOUSE, Mrs. MARGARET C. JAY, Mrs. GWEN LONGMOOR, Mrs. G. P. HOPKIN MORRIS, Lady OGILVIE, Mrs. HELEN H. PAWSON, Mr. ALFRED ROBERTS, Mr. W. D. ROBIESON, and the chairmen of the three technical committees.

Statistical Committee.—Prof. A. M. Carr-Saunders (chairman), Mr. V. P. A. Derrick, FIA, Mr. D. V. Glass, PH D, Mr. R. R. Kuczynski, Mr. J. G. Kyd, FFA, Mr. H. Campion, Mr. A. Reeder, Dr. Percy Stocks, Mr. F. A. A. Monzler, FIA, and Mr. G. H. Maddex, FIA.

Economics Committee.—Sir Hubert Henderson (chairman), Mr. E. C. Ramsbotham, Prof. Alexander Gray, Prof. J. R. Hicks, Mr. W. B. Reddaway, and Mrs. Joan Robinson.

Biological and Medical Committee.—Prof. A. W. M. Ellis, MD (chairman), Prof. E. D. Adrian, OM, MD, FRS, Prof. Dugald Baird, FRCOG, Dr. P. M. F. Bishop, Dr. C. P. Blacker, Mr. Eardley Holland, FRCOG, Dame Louise McIlroy, FRCOG, Mr. A. S. Parkes, SC D, FRS, Mr. E. W. Riches, FRCS, Sir Alexander Russell, MD, Dr. Percy Stocks, and Dr. J. G. Thwaites.

The Commission met for the first time on March 3. Mr. N. F. McNicoll of the Ministry of Health is secretary to the commission and the three committees.

FROM THE PRESS GALLERY

RAF Medical Branch

IN introducing the Air Estimates in the House of Commons on Feb. 29, Sir ARCHIBALD SINCLAIR, Secretary of State for Air, said that the dilution of training experience at the beginning of the expansion of the Royal Air Force was inevitably accompanied by an increase of accidents. But as training organisation became consolidated these difficulties had been surmounted and the upward trend of the accident-rate had been reversed. The rate for the RAF at home—most remarkably the accident-rate at night—had steadily fallen in the last two years. It was 30% lower in 1943 than in 1942, and was now lower than at any time during the war.

Another source of wastage which had been reduced was sickness. Though more of our units were serving overseas, often in unhealthy areas, there had been during the last twelve months fewer sick than at any time since the outbreak of war, and the RAF owed a debt to the medical profession. Remarkable strides had been made in the rehabilitation of men suffering from burns, severe wounds and accidents. The rehabilitation centres worked on the principle that it was not enough that a broken limb or a torn ligament or burnt fingers should be mended, if the patient was to limp or lose part of his skill of hand for the rest of his days. The essence of the new methods was to get the movement back by active, not passive, exercises, by beginning slowly but early, and above all by getting the patient to cure himself by convincing him that a cure was possible. Half the art of it was getting the confidence of the patient in his treatment and in his chance of getting fully fit again. That was why they aimed at putting their centres in pleasant surroundings and making the exercises active and constructive, so that the patient did not feel he was going merely through a set of motions but that he was already back in active work and active recreation. Over 80% of the patients in their centres had been able to get back to full duties, in a shorter time than a few years ago would have been believed possible. So, under the wise and vigorous leadership of Air-Marshal Sir Harold Whittingham, and with the unsparing and devoted help of the nursing service, their doctors and dentists, who also had found scope in their midst for original ideas and practices, contrived not only to heal but also to prevent sickness and thus strengthen the Royal Air Force for battle.

Development of Tanganyika

In the House of Lords on Feb. 29 Lord CHESHAM asked HM Government what steps they proposed to take to implement the recommendations contained in the report made to the Governor of Tanganyika Territory in May, 1940, by the Central Development Committee appointed in 1938. Lord FARINGDON said that probably the basic problem of Tanganyika was water, aggravated by an amount of dust in the highlands during the dry season, which was injurious to health, and in the wet season by an amount of mist and cloud which gave rise to respiratory troubles. The Territory was also cursed with the tsetse fly and the tick, which made the keeping of cattle impossible. Owing to sleeping-sickness and other causes, the forest was disappearing and the land becoming stepped, and the population more and more concentrated. Lord Faringdon quoted from a report by the commissioner for the Western province on the bad health conditions revealed by the rejection of over half the men for military service.

The Duke of DEVONSHIRE, in his reply, agreed that this was a matter of urgency but Tanganyika was possibly the worst handicapped of all the East African territories by shortage of white man-power. The committee's proposals were comprehensive and envisaged considerable expenditure, much of which under present conditions might not be appropriate. Whatever might be the proper future of these lands their ultimate disposal must await the end of the war. But it must not be assumed that nothing was being done. The governor had announced the creation of a development section of the secretariat which would be guided by an advisory committee under the chairmanship either of the governor or the chief secretary. This committee would include non-official representation and its main task would be to re-examine the Central Development Committee's report and to advise on the modifications necessary in the light of the changed circumstances brought about by the war. It was hoped that in the near future schemes for Tanganyika would be submitted for substantial assistance under the Colonial Development and Welfare Acts. But, as in other Colonies, the rate of progress would be conditioned by the men and materials available.

QUESTION TIME

A Controversial Subject?

Sir E. GRAHAM-LITTLE asked the Prime Minister whether in view of the pledge he gave in Parliament four months ago that the Government would not make far-reaching controversial changes not directly needed for the war effort until after a general election, and in view of the controversial nature of the proposals for a national health service detailed in the white-paper just issued (Cmd. 6502), he will postpone legislation to give effect to these proposals until a general election has pronounced its verdict upon them.—The PRIME MINISTER replied: The assumption that these proposals are controversial in the sense of seriously dividing the forces now united for the purpose of winning the war can best be tested by obtaining the sense of the House upon them in debate. This will become apparent in the ordinary course of parliamentary business.

Need for More Doctors

Sir IAN FRASER asked the Minister of Health if, in view of the need for an increased number of doctors and other trained persons to carry out the proposed National Health Service, he would consult with the appropriate departments with a view to promoting a plan whereby suitable young men and women, when they left the military forces, would be given financial help to enable them to qualify for this work.—Mr. H. WILLINK replied: The Committee on Further Education and Training under the chairmanship of Lord Hankey is considering the whole field of recruitment into the various professions after the war, especially from the Services. I have submitted evidence to that committee showing the probable needs of the services dealt with by my department—including the new health service. Financial assistance will be available to suitable applicants under the Further Education and Training scheme.

Grant for Medical Research

Replying to a question Mr. C. ATTLEE stated: The amount of the grant-in-aid for the work of the Medical Research Council is £215,000 in the current financial year. The proposal to be submitted in the estimates for 1944–45 is for £250,000.

Supplies of Sulphathiazole

During recent weeks there has been a substantial increase in the supply of sulphathiazole available for civilian use and production should now be adequate to enable all prescriptions to be met. (Mr. CHARLES PEAT replying to Sir LEONARD LYLE.)

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Letters to the Editor

THE WHITE PAPER

SIR,—The Prime Minister in a Parliamentary answer to me (*Hansard* March 3, 1944) queries my "assumption" that the proposals for a National Health Service detailed in the white-paper (Cmd. 6502) are "controversial" and therefore covered by the pledge he gave in Parliament (*Hansard* Oct. 13, 1943) that his government would not introduce "controversial" legislation "not indispensable to the war effort" until after a general election. He makes the novel claim that controversiality of these proposals can "best be tested by obtaining the sense of the House upon them in the debate" which is promised at some future date.

After a membership of nearly twenty years I should be the last to belittle the influence of the House of Commons; but I submit that the free press of this country is at least as authoritative a guide to public opinion, and no-one who has studied the press, both lay and medical, during the past two years can question the existence of widespread opposition to some of the major proposals of the white-paper. But the test preferred by the Prime Minister suggests the advisability that every effort should be made by the medical profession to inform individual MPs by personal approach in each electoral division, before Parliament debates the white-paper, of the fears which the vast majority of doctors in practice entertain regarding some of the changes contemplated.

House of Commons. E. GRAHAM-LITTLE.

RURAL HEALTH CENTRES

SIR,—The white-paper says, on page 28, "Group practices are more likely to be found suitable in densely populated and highly built-up areas . . ." I submit that it is in the rural and agricultural areas that the population will derive most benefit from the institution of health centres. These areas are least well provided with hospitals and with consultant services. It is the rural practitioner who is most out of touch with his colleagues and who runs the gravest risk of losing touch with modern developments in medicine. The small market town forms the natural focus of rural life and in these days of increased utilisation of road transport has become relatively accessible to the farming population, even in remote villages. The setting up of a well-equipped health centre in such small market towns would do much in a relatively short time to compensate for the inadequacy of other medical facilities such as hospitals, the building of which must necessarily be part of a longer term policy.

These centres will afford concrete proof that the Government is in earnest in its often expressed intention not to allow agriculture to become a forgotten industry again, as happened after the last war. We owe our continued good health, if not our lives and our freedom, to the agricultural worker. It is only right that he should have first consideration when the fruits of victory mature.

St. Mary Cray. BRIAN H. KIRMAN.

FIRST AID FOR FRACTURED SPINE

CLARKE-MOIR METHOD

SIR,—The executive of the British Orthopædic Association has declared its support for the view that "a patient with suspected fracture of the spine should be shifted and moved in such a way as not to be folded either backwards or forwards. The patient should be disturbed as little as possible, being transported 'as he lies.'"

With the help and advice of Prof. Harry Platt, Air-Commodore H. O. Clarke and I have evolved a method of first-aid which embodies these principles. We should be grateful for criticism of our instructions, as now modified [1]:—

INSTRUCTIONS TO FIRST-AIDERS

A.—In *all* cases of suspected injury to the spine:—

(i) Warn the patient to lie still.
(ii) Leave him in the position in which he lies.
(iii) Cover him up to keep him warm.
(iv) Send for the doctor.

B.—If medical assistance will soon be available, do not attempt to move the patient unless he is in danger of further injury. Stand by to assist the doctor. Meanwhile send for hot-water bottles, blankets, a stretcher (improvised or otherwise), 8 triangular bandages, 2 poles.

C.—If the patient must be moved before a doctor arrives, secure helpers (six if possible) and proceed as follows:—

(i) Prepare the stretcher with blankets (3 if possible) by one of the usual methods. Arrange pads, according to the position in which the patient lies, as follows:—
  (*a*) *Lying on back.*—Pads to support neck and loins.
  (*b*) *Lying face downwards.*—Pads to support shoulders and hips.
  (*c*) *Lying on side.*—Small pad to support neck.
(ii) Place padding between the ankles and tie them together with a figure-of-8, knotted under the soles.
(iii) Place padding between the knees and bind the legs to one another with 2 broad-fold bandages—one round the thighs and one round the knees.
(iv) *Without moving the patient,* pass 5 narrow-fold bandages under natural hollows of the body—1 under the neck, 2 under the loins, and 2 under the knees—*from alternate directions.* (For this purpose they are looped over the end of a splint which is then pushed through the hollow. Gently work these bandages into position so that they lie under (*a*) the head, (*b*) the shoulder-blades, (*c*) the buttocks, (*d*) the thighs, and (*e*) the calves.
(v) Pass the poles through the loops on each side, and tie the free ends of the bandages over them.
(vi) If the patient is lying on his side, support him, front and back, with blankets or pillows, so as to keep him in the position in which he was found.
(vii) To move the patient on to the stretcher, each pole is grasped by assistants (preferably three aside) with hands apart. Slowly and evenly he is lifted; the stretcher is placed beneath him; and he is then lowered into position on it, so that the pads are in the right position for giving the support required (see i).

D.—When the patient is transferred from the stretcher to a fracture bed or table, the stretcher is brought to the bedside, the top blanket is removed, and the poles—if they have been taken out—are again passed through the 5 looped bandages, which are still in position. The flaps of the blanket on which the patient is lying are then rolled in round the poles to give additional support. With the hands well apart, the poles are grasped and the patient is slowly and gently lifted on to the bed *in the position in which he was first found by the first-aider,* and is kept in that position till seen by the surgeon.

Cemaes Bay, Anglesey, N. Wales. J. L. MOIR.

1. See *Brit. med. J.* 1942, ii, 529, 744; 1943, i, 614.

SHALL BASSINI DIE?

SIR,—It may be of interest to your readers to hear the voice of a Continental surgeon. It was, I believe, not the merit of Bassini's technique, but the fact that it synchronised with the introduction of asepsis into surgical practice, that led to its wide acceptance. Polya criticised it thirty years ago. I was for 25 years in surgical practice in Vienna and during that time I did many hundred operations for hernias. For the first 15 years I used the Bassini and sometimes the Kocher method for the repair of the *indirect* hernia, fascia lata graft for the repair of *direct* and *recurrent* hernia. I had recurrences of over 10% in indirect hernia (after Bassini); only 3·7% in direct hernia and 1% in recurrent hernia (repaired by fascia lata). I then gave up the Bassini method and for the last 10 years treated *indirect* hernia by overlapping the external oblique fascia, *direct* and *recurrent* hernia by fascia lata graft. I found the important items for success were: (1) gentle separation of the sac from all the constituents of the cord as far as beyond the internal ring and ligatured without twisting. (A twisted stump when untwisted may show slight protrusion of peritoneum); (2) closure of the gap in the transversalis fascia, leaving ample room for the cord; (3) repair of any defect or weakness of the abdominal wall by overlapping of the external oblique fascia or by simple fascial graft. For children the Lameris operation, simple excision of the hernial sac, is sufficient.

Loughborough. NORBERT SCHICK.

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CONSERVATIVE TREATMENT OF THE SEPTIC HAND

SIR,—As a casualty officer I treated several hundreds of cases by methods similar to those described by Egerton and Bowen in your issue of Feb. 26.

1. I agree about the great value of immobilising a septic hand. Most mild infections will subside satisfactorily without other treatment.
2. Why give sulphanilamide as a routine? It is a dangerous drug, and its toxic effects are more frequent and severe than Egerton and Bowen admit. Moreover (I write far from a library) how much hand sepsis is caused by bacteria susceptible to sulphanilamide? Surely less than 5%, and these cases are easily recognisable.
3. I found that the "carbuncle" type of infections responds excellently to short-wave therapy, given without removing the part from its splint. I agree that moist heat is worse than useless.
4. Surgical interference, other than "nicking" the horny layer, *is* sometimes necessary. "The bad results of surgery are the results of bad surgery"; no more fitting site than the hand could be chosen to illustrate this saying. When surgical interference is indicated, it is during a critical period, lasting only a few hours. Incision too soon, too late, or badly placed, leads generally to prolonged suppuration and disability. Considerable experience is therefore necessary. But too often, as Iselin points out, septic fingers are opened on the corner of a desk, with a blunt scalpel and a "squirt" of ethyl chloride; or by a harassed and inexperienced house-officer in a dirty casualty department.

Egerton and Bowen go too far, I think, in their eagerness to avoid surgery. As long as the above conditions persist, their method will give better results than indiscriminate incisions; but their bad results, though relatively few, will be very bad indeed.

The septic hand is the most common cause of industrial disability, and until "finger clinics," with careful record and follow-up systems, are far more widely recognised and established, we shall continue to get the results which Egerton and Bowen so rightly deplore; and we shall continue to lack the data required to improve our results.

Home Forces. P. J. R. D.

OCCUPATIONAL THERAPY

SIR,—In your leading article of Feb. 19 attention is drawn to the present shortage of occupational therapists, and as you suggest that such training cannot begin too soon it may be of interest to record what has already been done, largely owing to the activities of the Emergency Medical Service.

Three years ago the Ministry of Health invited the Dorset House School of Occupational Therapy from Bristol to the Barnsley Hall EMS Hospital, Bromsgrove, and provided it with generous accommodation in huts. Special grants were made by them to suitable candidates so as to make personnel available as quickly as possible while maintaining a high standard of professional efficiency. As suggested in your article, physiotherapists had in their training covered much of the ground needed in anatomy and physiology, and those who have qualified from physical training colleges and some craft teachers have been particularly successful candidates, because they have had experience of handling classes as well as individuals.

Special courses were instituted to give all students a good working knowledge of psychology and an understanding of functional disabilities, together with intensive teaching on joinery, weaving and other necessary crafts and their remedial application. All students take the examinations of the Association of Occupational Therapists in anatomy and physiology and all other crafts required for their work, a special war diploma having been instituted as well as an examination for short-course auxiliaries. Training includes hospital practice in curative workshops already provided in all the large orthopædic hospitals, and joiners, builders, gardeners and other technicians are at work under the head occupational therapists. Lathes, benches and heavy looms are available to work up the patients' muscle tone. Though the student must be trained in lighter crafts for weak muscles, it is thoroughly understood that there must be nothing in her work of the dabbling amateur in embroidery and raffia. Occupational therapy includes the supervision of such subjects as shorthand, languages and dressmaking, though classes for these are usually provided for the hospital patients by the local education committee. The occupational therapist must learn to organise the assistance provided by auxiliaries who have taken a short special course to work under her, and by voluntary helpers who give valuable assistance in recreative activities such as music, games, light needlework and the choice of books.

The full course of training for an occupational therapist takes 2½ years, but after the first year hospital practice gives an opportunity for much useful work even before qualification. The special war courses can be as short as 6 months for suitable candidates.

The Dorset House School has provided 98 fully qualified occupational therapists since its foundation, and has had the privilege of staffing two of the EMS hospitals you mention, Ashridge and Horton, besides a number of others that are being used by the EMS for their special short instructional courses for doctors and other members of the new rehabilitation staffs. Nineteen more students and 17 auxiliaries are about to qualify, and 57 are in training as well as 21 auxiliaries. Including those trained elsewhere, the Association of Occupational Therapists had 108 full members at the time of its 1942 annual report, and the number must now be much higher. A film illustrating its methods of training used at the Barnsley Hall School is available for medical audiences, and visitors to the school are always welcome.

Dorset House School of Occupational Therapy, Bromsgrove. ELIZABETH CASSON, Medical Director.

COMMON SENSE IN ANÆSTHETICS

SIR,—Adequately to reply to all the points (and side-issues) raised in connexion with my paper of Dec. 11 would need an impossible amount of space. I hope it will be understood if only essentials are treated.

Reading the letter from Prof. Macintosh and Dr. Mushin (Dec. 18) one is immediately struck by the fact that they only digested one of my 50 references. One must conclude that their letter was composed in some haste. My reply is more deliberate.

To anæsthetists in hospitals which have dealt with air-raid casualties it has been proved by hard blitz experience that ether needs to be *avoided* whenever possible in shocked people.

A further study of Halford's paper (*Anesthesiology*, 1943, 1, 69) reveals several points not mentioned. He says that under war conditions anæsthetics have to be given by nurses and orderlies to whom the art is strange. With one or two regrettable exceptions, efforts to use unqualified persons in anæsthesia in English hospitals have met with nothing but condemnation, apart from dire emergency. My experience of junior medicos and students has shown how rapidly they can be trained to use these up-to-date methods and how much safer they can be in anæsthesia if one does not consider merely on-the-table survival. Surely a professorial unit is *the* place for such training in numbers. The shortage of skilled anæsthetists is well known. With reference to Pearl Harbour, Halford says, "All victims were totally unprepared in mind or spirit. . . ." That this must have also applied to medical personnel is borne out by "There was a definite lack of oxygen and equipment . . . likewise there was confusion concerning the individual oxygen demands." Has my statement been overlooked concerning 'Pentothal' and high oxygen in shocked casualties? Practical experience on the spot, not quotation from other people's papers, has proved to me and many others exactly the reverse regarding pentothal and shock.

My cases were all American Hospital in Britain and EMS patients, and therefore mainly Service cases suffering from tobacco cough. Kaye was correctly quoted by me, but he further states, "The great majority of the cases . . . occurred after ether anæsthesia"!

My figures reveal that abdominals show 8 times the respiratory morbidity of the others, in whom it is almost negligible.

They say at the Radcliffe Infirmary, "we use ether extensively in routine lists," and later, "in abdominal cases

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regional anæsthesia is employed almost routinely to give the necessary relaxation." One cannot conceive it necessary to use *both* to attain relaxation. The alternative explanation is that they too have discovered the wisdom of avoiding ether in abdominal surgery.

The technique (Jarman's, not mine) of "combining in the one patient pentothal, spinal and N_2O–O_2," used daily in London, is hardly likely to be required in a pitching destroyer unless surgeons take to performing gastrectomies and the like in such odd circumstances. Conditions permitting elaborate surgery must likewise permit of elaborate anæsthesia.

Macintosh and Mushin will see that my "bigoted attitude" *has* in fact been equalled, by referring to a paper on the Oxford vaporiser emanating from their department which states "Any condition of general anæsthesia required and for which ether is not contra-indicated because of explosion risks has been obtained satisfactorily with it" (Bannister, F. *Proc. R. Soc. Med.* 1943, **36**, 206).

It is accepted that if the expert anæsthetist is not available the method needs to be safely and easily taught to intelligent novices. The question of safety however is generally considered to extend into the postoperative period, when ether does its main damage! Postoperative comfort for the unfortunate patient appears to find no place in the views expressed by Macintosh and Mushin.

The suggestion that more patients would be alive today if modern anæsthetics had not been discovered surely reflects not on the anæsthetics but on the lack of simple training in their use.

May I thank Dr. Rowbotham (Jan. 8) for the compliment in his last paragraph; as a student I gave many hundred anæsthetics in a hospital then possessing no anæsthetic machine except a Clover. The results he describes are attributable by anyone who has seen him at work (as I have) to his great skill coupled with the very small amounts of ether he states were used.

Dr. Holroyd (same issue) makes some sound points, but compared with the agents I have stressed I have found ether a bad servant—and recommend dismissal. Pentothal (like many an excellent servant) needs a strict master. Few will agree nowadays that ether is the best choice for "bad risks." As a "stimulant" it is only comparable to alcohol—now completely "debunked."

The letter from Dr. Richards and Mr. Smith (same issue) needs amplification.

The reason why patients anæsthetised at Horton are not in the present series are: (1) a large number had some ether, which may account for their poor postoperative state; (2) many were given by student beginners, which accounts for their sometimes moving; (3) details of most of those who *did* have "modern anæsthesia" (Dunkirk casualties) have already been published (*Proc. R. Soc. Med.* 1941, **34**, 635). Mr. Smith may remember that there were no resuscitations, complications or deaths within 7 days—likewise his enthusiasm at the time!

Cyanosis was not allowed, at any rate to anything approaching the extent often observed in patients undergoing "GOE" inductions at the same time. They omit the fact that the case which "collapsed and died some hours later" was an ex-publican with severe fatty degeneration of heart and liver, as the autopsy showed, but to which the clinical notes unfortunately gave no clue; a nasty risk for any anæsthetic.

They omit to mention that the alleged "mental changes" occurred in an arteriosclerotic of 69, or that he confounded the neurologist by recovering completely in 24 hours, or that his relatives later revealed that these symptoms had arisen before!

Why no figures for all these complications most of which are news to me) and for the improved 2nd period mentioned? "Inability to conclude" is a poor substitute for concrete details, and shows in addition how dangerous half-statements unsupported by statistics can be. Improvement in resuscitative measures seems an unusual, though perhaps illuminating, reason for continuing the methods employed in the last war nearly 30 years ago.

Dr. Elam (Jan. 15) has at least tried to produce figures to support his arguments. Unfortunately, as statisticians can show, figures of deaths unrelated to numbers of administrations are meaningless. Otherwise, on his reasoning, it is easily seen that ether with 169 deaths is the most dangerous of all anæsthetics, and ACE the safest with 3. Dr. Elam's contention regarding the danger of pentothal, supported as he stresses by the Registrar-General's figures, thus fails conclusively, being based on a statistical misconception.

As I read Betcher's paper (quoted by Dr. Elam), "experienced hands" are contrasted with enlisted men lacking education in physiology, biology or other medical subjects. I refer Dr. Elam to paragraph 4 of this letter. The answer to his query regarding the chloroformists is to the best of my knowledge "No."

My friend Dr. Galley (Jan. 22) sheds much light on several points; one could wish for more such fair-minded criticisms. Our views coincide on the diminishing place that ether holds. I feel sure this diminution will progress. In my paper I said "In my view ether is best avoided wherever possible . . . and in future should be eliminated altogether," and demonstrated on 1000 cases the feasibility of this. He rightly deplores the storm this progressive attitude has evoked.

Of course ether will not finally be displaced till the occasional anæsthetist, whose activities are admirably condemned by Dr. Allen (Feb. 5), disappears (let us hope, for the sake of both the anæsthetist's economics and his standing, soon), and until proper training is instituted, as Dr. Sunderland's fine contribution to the discussion vividly illustrates (Jan. 22). Finally, the more anæsthetists follow up their cases, the sooner will ether's diminishing place progress to extinction among specialists.

Basingstoke. F. BARNETT MALLINSON.

TREATMENT OF GONORRHŒA WITH SULPHATHIAZOLE

SIR,—In the summer of 1943 it was decided to make a trial of the treatment of acute gonorrhœa by a single massive dose of sulphathiazole. In order to simplify the investigation, only uncomplicated cases of acute anterior urethritis were chosen.

On admission to hospital the urine was examined for sulphonamide to exclude recent self-treatment. As soon as the diagnosis of gonorrhœa was confirmed by smears the treatment was begun. A single dose of 10 grammes of sulphathiazole in 0·5 g. tablets was given with milk, usually at the rate of five tablets every 15 minutes until the full twenty tablets had been given. The patient was kept in bed for the next 24 hours and given large quantities of fluid. At least 10 pints were taken, but more often 15 pints were taken in the first 24 hours, the patient being awakened at intervals during the night to drink. Urethral smears were examined next day, and all the urine passed during the first 24–48 hours was examined. As soon as all urethral discharge had ceased, tests were carried out; these consisted of the passage of a sound and massage of the urethra over it, prostatic smear and urine examination. If these tests were negative the patient was discharged from hospital as provisionally cured, to undergo a period of surveillance.

Results.—It is unfortunate that owing to the exigencies of the service the investigation was cut short. A total of 57 cases were treated. In the large majority the results of further observation after leaving hospital were not available; but no patient discharged from hospital as provisionally cured was known to relapse.

Fresh acute gonorrhœa.—Of a total of 54 cases, gonococci permanently disappeared from the urethral discharge within one day in 48. In 29 of these all discharge had ceased within four days. In 19, however, a persistent discharge containing no gonococci persisted for an average of eleven days but eventually cleared with or without a few days of urethral irrigation. Six cases failed; in these the urethral discharge never stopped, and gonococci were found on the 4th day in 2 cases, on the 9th day in 2 cases, and on the 3rd, 5th, and 17th day in one case each. No complication or spread of the infection was found in any case.

Relapsed gonorrhœa.—The 3 cases treated had relapsed after sulphapyridine. All of these were gonococcus-free after 24 hours, and in 2 all discharge stopped in three days. In the third case the discharge persisted for ten days and then stopped.

Toxic manifestations.—Headaches, dizziness and nausea were occasional complaints, but were never serious. No patient complained of urinary symptoms other than those of his urethritis. The presence of sulphonamide crystals in the urine on standing was almost invariable in the first 24 hours,

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sometimes in large quantities, but red blood-cells were not found. No drug rash was seen.

Conclusions.—The results obtained in this small series seem sufficiently promising to make a further trial worth while. Given an adequate fluid intake the large dose of sulphathiazole seems to be harmless, and as the treatment can be said to last only 36 hours there is a great saving of time, as compared with the usual five-day or 6-day course. Although the standards adopted are not quite the same, the results of a single high dose appear to be superior to those obtained by Jefferiss and McElligott (*Lancet*, 1943, i, 65), with divided dosage spread over 12 hours or less.

F. R. BETTLEY.
R. BAKER.

SHELTER LEGS

SIR,—Now that air-raids have returned to London and people may again be spending their nights in shelters, it may be helpful to draw attention to a resultant effect which was fairly common in 1940. During the last two years several women have presented themselves for treatment at the Charterhouse Rheumatism Clinic complaining of swelling of their legs and stiffness of their ankle-joints and believing themselves to be suffering from rheumatism. They all evinced the same signs—a hard brawny swelling of the legs below the knees, giving rise to unsightly legs, a feeling of heaviness and limitation of movement at the ankle-joints due to the swelling. All these women had spent their nights sleeping in deck-chairs, and the resulting pressure on the popliteal space during the relaxation of the muscles gave rise to chronic lymphatic obstruction. Unfortunately the condition appears to be permanent, no form of treatment having any effect in lessening the degree of swelling. A word in time may prevent others incurring a similar fate.

London, W.1. F. E. GRAHAM-BONNALIE.

CONTROL OF PERTUSSIS

SIR,—I read your leading article of Feb. 5 when I had just finished analysing my cases given pertussis vaccine in 1942–43. The evaluation of vaccines in the treatment and prevention of whooping-cough presents difficulties in choosing criteria for comparison of cases. In the series described below all the cases are children, and they have been divided into groups according to the number of nights during which they have required attention from the time they received the vaccine. Thus cases requiring attention for 7 nights or less are called "excellent," for 14 nights or less "fair," and for more than 14 nights "poor." This aspect of the cases may thus be unduly emphasised, but it gives a fair criterion of the severity of the condition, and from the point of view of the mother, or relative in charge, is usually the most important and trying part of the disease.

Of 51 children given pertussis vaccine (dissolved vaccine, Glaxo Laboratories) for whooping-cough during 1942–43, the cases are classified as:

Excellent 19 .. Fair 17 .. Poor 15 .. Total 51

An analysis of the cases throws a different light on the subject. First take 13 households in which more than 1 child developed whooping-cough. Of the 13 original cases, the records show:

Excellent 2 .. Fair 5 .. Poor 6

But of the 17 secondarily infected children, the cases are:

Excellent 10 .. Fair 5 .. Poor 2

The original cases were given the vaccine after the disease was either recognised or suspected. The other children in the family were given the vaccine before the disease showed symptoms, or when the preliminary symptoms were extremely modest. One child in this group did not develop any symptoms of whooping-cough.

Of 21 single cases, the record shows a pleasing regularity of distribution, 7 cases being placed in each group of excellent, fair and poor. These have been subdivided into two groups—those given the vaccine within ten days of the start of the cough, and those given the vaccine later. The 12 children who had the vaccine early can now be redistributed as follows:

Excellent 6 .. Fair 3 .. Poor 3

And the 9 children who had the vaccine later show:

Excellent 1 .. Fair 4 .. Poor 4

The vaccine was given to 6 children who were contacts with whooping-cough; 2 developed the disease, 1 being placed in the excellent and 1 in the poor group.

This small record was made because I believed both from published papers and my own experience that pertussis vaccine was of little value. The fewness of the cases leaves room for the effect of chance, but the results at least give encouragement to the use of the vaccine early in the disease, till a sufficient number of cases have been observed to put the matter beyond dispute.

Leeds. R. A. MURRAY SCOTT.

SCHOLARSHIPS FOR NURSES

SIR,—In your issue of Feb. 26 Miss Cockayne has drawn attention to the postgraduate scholarships for state-registered nurses recently established by the Hospital Saving Association in celebration of the twenty-first anniversary of its incorporation. It frequently happens that a nurse, after some years of experience as a ward sister, is attracted to some special branch of work but is unable to meet the expense of postgraduate study. Some of the larger hospitals are able to offer a few scholarsship to their own nurses for this purpose but the number is limited. At a time when the importance of social medicine is being recognised it is gratifying to find scholarships established for nurses who wish to become health visitors, or to undertake work in the field of industrial medicine, as well as for those anxious to qualify as sister tutors, midwifery teachers or nurse dietitians. No fewer than 26 such scholarships have been established varying in value from £65 to £250 each, depending on the length and cost of the course of instruction.

The Royal College of Nursing has shown its appreciation of the action of the HSA by agreeing to undertake the conduct of the necessary examinations, and any state-registered nurse who has received her training at a hospital within the London area, whether voluntary or municipal, is eligible.

This benefaction is timely, and a clear indication of the progressive attitude of the HSA. It comes, too, at a time when the almost complete absence of reference to contributory schemes in the white-paper has had the effect of calling attention both to their existence and their importance.

Guy's Hospital. T. B. JOHNSTON.

FUNCTION OF STEROLS

SIR,—Dr. Raymond Greene in his letter of Feb. 12 flings the usual gibe at psychiatrists. Nevertheless one continues to hope that endocrinologists will help in a psychosomatic approach to the problems of the neuroses (p. 283). As you comment on Feb. 26, corticosterone has an effect on carbohydrate metabolism. This hormone was used with success in the cases of psychiatric casualties in Barcelona. Testosterone had a similar action on our battle neurotics.

ALFRED TORRIE.

PSYCHIATRIC APPOINTMENTS

SIR,—The council of my association have requested me to forward the following resolution which they have approved.

> The medical planning committee of the Royal Medico-Psychological Association deeply deplore the advertisement of permanent appointments in the psychiatric services of the country during the present emergency and submit that no appointments of a permanent character should be made until psychiatrists now serving in HM Forces are free to compete on equal terms with those not so serving.

Royal Medico-Psychological Assn., Chandos Street, W.1. W. GORDON MASEFIELD, Hon. General Secretary.

TRILENE ANÆSTHESIA

SIR,—In a series of 500 consecutive trichlorethylene ('Trilene') anæsthetics at Pinderfields Emergency Hospital, Wakefield, several points of interest emerged. About 16% developed cardiac irregularities, all after the anæsthetic had been in progress for 10 minutes or longer. The standard Boyle machine was used in each case without the carbon-dioxide absorber, using partial rebreathing, nitrous oxide and oxygen being given along with

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the trilene. In 25 patients when the cardiac irregularities became evident I changed to nitrous oxide, oxygen and ether, turning the trilene off completely, and in every case the pulse became regular in 3–10 minutes. After the change to ether all these patients gradually developed a rise in blood-pressure and the pulse-pressure rose from 5 to 80 mm. Hg within 10–20 minutes of the change. The surgeon often complained of excessive bleeding and 5 out of the 25 patients had hæmorrhages. Premedication in every case was morphine gr. $\frac{1}{6}$, atropine gr. 1/100 and 'Nembutal' gr. 3, all given $1\frac{1}{2}$ hours before operation. Three had epistaxis, one of a very violent type, one had bleeding from the gums which showed bad pyorrhœa, and another had violent bleeding from the hæmorrhoids on which the surgeon was operating. All the patients had an oral airway and none was intubated. All the hæmorrhages ceased when the anæsthetic was stopped and the patient allowed to breathe air or put on to open ether admitting plenty of air. The cases complicated by hæmorrhage were as follows:

1.—Male, aged 18. Operation, orchidectomy. Induction was smooth; after about 10 minutes the anæsthetic was changed to ether on account of an irregular pulse. Before operation the pulse-rate was 126 per min. and the blood-pressure 130/98 mm. Hg. After 10 minutes on ether the blood-pressure became 160/110. When the mask was removed the patient was bleeding severely from the nose.

2.—Male, aged 41. Operation, hernial repair. A change over was made to ether because the patient had a respiratory arrest and there was violent sweating. Before operation the pulse-rate was 108 and the blood-pressure 130/90. After 10 minutes on ether the pulse-rate became 96 and the blood-pressure 170/100. There was considerable nasal hæmorrhage.

3.—Male, aged 18. Operation, hernial repair. This patient had trilene in induction only, which was very smooth. After about 20 minutes on ether moist sounds were suddenly heard and on removing the mask the patient was having a severe nasal hæmorrhage. Before operation the pulse-rate was 96 and the blood-pressure 150/100. At the time of the hæmorrhage the pulse-rate was 120 and the blood-pressure 180/110. The operation was finished with open ether and oxygen, admitting plenty of air. The bleeding soon ceased after the change to open ether.

4.—Male, aged 37. Operation, excision of varicose veins. This patient was put on to ether because of an irregular pulse which soon became regular after the change over. Before operation the pulse-rate was 72 and the blood-pressure 130/100 After 15 minutes on ether the pulse-rate was 84 and the blood-pressure 200/100. The patient had bleeding from the gums which were severely affected by pyorrhœa.

5.—Male, aged 19. Operation for hæmorrhoids. A change to ether was made because of an irregular pulse, which then soon became regular. Before operation the pulse-rate was 72 and the blood-pressure 130/90. After 10 minutes on ether the blood-pressure rose to 170/100; the pulse was not recorded. There was excessive bleeding from the operation site which could not be controlled until the anæsthetic was stopped.

None of these patients was subject to nose-bleeding. Blood investigations were carried out on all cases except case 3; no abnormalities were found.

A control series was then undertaken with a change over from nitrous oxide, oxygen and trilene from a Boyle machine to open ether and oxygen, admitting plenty of air. This sequence brought about little alteration in blood-pressure and only one or two patients showed a small rise in pulse-pressure, this occurring after a layer of gamgee tissue had been put over the mask, thus partially excluding air. After open ether had been given for 15 minutes two patients were put on nitrous oxide, oxygen and ether from the Boyle machine and in each case within a short time there was a rise in blood-pressure and pulse-pressure.

This big rise in blood-pressure and pulse-pressure, occasionally complicated by hæmorrhages, has not been encountered when the same Boyle machine has been used in the same way with nitrous oxide, oxygen and trilene or with nitrous oxide, oxygen and ether. Are these troubles due to excess carbon dioxide in the re-breathing bag together with trilene and ether bringing about some decomposition of trilene vapour?

All these cases did very well ultimately but more serious hæmorrhages might occur in patients with gastric ulcer, pulmonary tubercle, &c. Trilene is now being used as an analgesic in midwifery, and if operative interference requiring full anæsthesia becomes necessary closed ether following trilene might cause serious hæmorrhage.

Wakefield. EMILY E. JOHNSON.

Public Health

Smallpox in Middlesex

ON Feb. 6 a military patient from the Middle East was admitted to the Mount Vernon Emergency Hospital near Rickmansworth. He had been vaccinated successfully in infancy and again 2 years ago. After a few days he had what was regarded by competent medical officers as measles and chickenpox, and the true nature of the condition was not found out until an unvaccinated nurse, who had been in attendance on him, and an unvaccinated visitor to the ward in which he was, developed confluent hæmorrhagic smallpox. Both these patients died. Subsequently 4 vaccinated nurses developed modified smallpox and had much the same manifestations as the primary case. All were mild. A 52-year-old patient, vaccinated as an infant, who occupied a neighbouring ward to that in which the primary case was, and which had a staff in common with that ward, developed a severe attack and died. All the cases were limited to a small division of the hospital, and so far as is practicable all persons known to have been in recent contact with them have been traced and vaccination or revaccination offered.

There have, however, been a large number of visitors to the hospital whom it is not possible to trace and practitioners are asked to bear this in mind when called in to see doubtful cases. The strain is intensely virulent, but is obviously so susceptible to vaccination as to obscure a clinical picture and render diagnosis difficult. The possibility of diffusion cannot be disregarded, and practitioners and medical officers of health are reminded of the assistance in diagnosis available from the medical staff of the Ministry of Health (Whitehall 4300), both regional and central, and from the London County Council (Waterloo 5000).

Annual Reports for 1943

The circular from the Ministry of Health on what the MOH should include in his report for last year differs from those for the previous war years in asking for specific information on tuberculosis, including the new allowance scheme, on venereal disease and diphtheria immunisation, and on steps taken "to improve the general standard of cleanliness and to combat infestation by head-lice." Noteworthy is section 6 of the circular requiring information about the adequacy and quality of the water-supply, while observing the prohibition in section 5 on security grounds to mention extensions of water-supply, or sewage works, or other public utility undertakings. The information required, which deals chiefly with dwelling-houses, presumably bears on immediate postwar extensions of water undertakings (circ. 2899) and which shall be given priority. Most of it will be to hand in the records at the health offices; but where it is not it will give some trouble and take time. Population figures and so forth must not be given and the reports are to be as short as possible, but any important epidemic episode should be fully recorded. There were not many such.

A Rent Tribunal

The Rent of Furnished Houses Control (Scotland) Act, 1943, has been applied to the city of Dundee by the Secretary of State for Scotland, who has also appointed a rent tribunal. Any person renting a furnished house or part of a house in the area, or a house or part of a house let with services, who thinks that the rent charged him is too high, can now apply to this tribunal to have it considered and fixed at a reasonable figure.

Infectious Disease in England and Wales

WEEK ENDED FEB. 26

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 1948; whooping-cough, 1810; diphtheria, 690; paratyphoid, 6; typhoid, 7; measles (excluding rubella),

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1796; pneumonia (primary or influenzal), 858; puerperal pyrexia, 143; cerebrospinal fever, 75; poliomyelitis, 4; polio-encephalitis, 1; encephalitis lethargica, 2; dysentery, 234; ophthalmia neonatorum, 63. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Feb. 23 was 1702. During the previous week the following cases were admitted: scarlet fever, 108; diphtheria, 27; measles, 38; whooping-cough 66.

Deaths.—In 126 great towns there were no deaths from enteric fever or scarlet fever, 1 (0) from measles, 14 (1) from whooping-cough, 11 (2) from diphtheria, 60 (10) from diarrhœa and enteritis under two years, and 46 (3) from influenza. The figures in parentheses are those for London itself.

There was a slight rise in the number of deaths from influenza, 46 as against 38 last week; 4 of the deaths were at Birmingham, no other great town reporting more than 3. Birmingham also had 6 fatal cases of diarrhœa. There were 3 deaths from whooping-cough at Liverpool.

The number of stillbirths notified during the week was 222 (corresponding to a rate of 31 per thousand total births), including 17 in London.

Obituary

JOHN FAWCETT

MD LOND, F R C P, F R C S

GUY'S HOSPITAL has never had a more devoted son than John Fawcett, who died on Feb. 18. He was the last of her physicians bred in the school of Wilks. For him clinical medicine was based upon morbid anatomy, and a drug not something to be thrust into an invalid's stomach but a weapon to be used with skill like a rapier but never a broadsword. He would listen to the evidence of the laboratory, but he gave no heed to the lure of the traveller's chatter and a proprietary preparation was anathema to him.

Lizzie Caswall Smith

Born in 1866, the son of John Bisdee Fawcett, of Lloyd's, he was educated at Dulwich College. His parents died when he was young, and he and his six brothers and sisters were adopted by an uncle and aunt. John entered Guy's as a university student in 1885, graduating in 1890. After holding a house-appointment, as Beaney scholar he did some work on the salicylates. He was appointed to the staff at Guy's in 1899, becoming physician in 1906, and on his retirement in 1926 was elected consulting physician. In the last war he was attached to the 2nd General Hospital at Chelsea. He was also for a time an assistant physician to the Royal Free Hospital and he remained a staunch supporter of the principle of single-sex medical schools.

Fawcett was down at the hospital every Sunday when it was his turn for duty, and often on other Sundays too, if any of his patients were seriously ill, and a colleague thus describes his characteristic reaction on being asked to see a case in the surgical wards:

First, he would bristle and refuse to come because his junior colleague never turned up on his Sunday on duty and was unavailable. Then, immediately changing his mind, drawl "Oo, well, yer know, if the patient needs me." By this time he would have turned towards the ward, where he would go over the patient with his usual care, discuss the case in detail, till he suddenly realised he would be late for midday dinner unless he hurried. And then, like as not, he would turn back halfway over London Bridge to tell the house-surgeon that perhaps the dose ordered was rather much for a child and should be two minims less. It was the same with outpatients. He began at 1.30, and at 7 he would be helping one of them who had been given mist. acid. co. instead of mist. gent. iod. to get her proper medicine. And after dinner he would sit till midnight writing to the doctors who had sent their patients to him.

He succeeded his great friend Lauriston Shaw as dean of the medical school in 1900, but resigned in 1903. Guy's was the leading school in favour of the concentration of medical schools in the preclinical period, but the conservatism of John Fawcett would have none of it, and his conscience would not allow him to continue as dean. If he was appointed to a committee, he attended with the utmost regularity, for he held that however unimportant the agenda might appear something was likely to emerge which would become important at the next meeting. After the last war the medical committee at Guy's decided that its chairmanship should go by election instead of seniority, and then, when Shaw retired, solemnly elected the next senior physician, John Fawcett, for the next ten years. Some thought his conservatism out of place, but he held the staff together and had a steadying influence during an unbalanced period.

After his retirement Fawcett was often ill, but he never allowed his illness to interfere with his duties as a governor of Guy's and Dulwich College, as a member of the council of Thomas's, as founder and treasurer of the Old Alleynian endowment fund, or with his work for Epsom College and the Invalid Children's Aid Association. In 1899 he married May Fleming, daughter of Herbert Fleming Baxter, who with their son and daughter survives him.

A. F. H. writes: John Fawcett was everybody's friend. I am quite sure he never had an enemy. No man ever deserved better the name of "honest John," by which he was universally known at Guy's. He was not an inspiring teacher, but his ward clerks never failed to learn many useful lessons from him. The chief of these were to treat their patients as human beings and not as mere cases, and to make a really thorough clinical examination, however unlikely it might seem that this would reveal anything abnormal. Fawcett's insistence on thoroughness was of great importance at a time when biochemical and radiological investigations were rapidly increasing in accuracy and were too often thought to offer short cuts to diagnosis. There is even more danger today that the sound clinical methods of men like Fawcett should be neglected by teachers of medicine who find their spiritual home in the laboratory rather than at the bedside. John Fawcett was the first member of the staff to speak to me when I entered the hospital forty-three years ago. He has been a good friend to me ever since, and I have none but the happiest memories of dear old Honest John.

DONALD UVEDALE OWEN

MD LPOOL, FRCP, DTM & H; LIEUT.-COLONEL RAMC

NEWS has been received that Colonel Donald Owen has died from an aplastic anæmia while on his way home from service in the Middle East. Owen graduated from the University of Liverpool in 1923 and for a time worked as clinical pathologist at the School of Tropical Medicine under Warrington Yorke. But his appointment to the staff of the Royal Southern Hospital and later of the Royal Infirmary widened his interests and he turned with characteristic energy from specialised to general medicine. As a Territorial officer he was called up at once on the outbreak of war and posted abroad in charge of a general hospital. His early experience in tropical diseases made him an obvious choice as director of special investigations. The value of his work was readily acknowledged by military and medical colleagues and he was mentioned in dispatches and elected to the fellowship of the Royal College of Physicians last year when he already lay ill in South Africa.

A Liverpool colleague writes: Donald enjoyed his medical work and enjoyed life. He was a foundation member, and the first president of the Innominate Club, the most junior of the medico-literary clubs in Liverpool. He was a keen tennis player, and he and a gynæcological colleague made up a doubles pair for Mersey Bowmen. He liked dancing, parties, students' dinners, all sorts of human contacts, and made them pleasant for other people. Good-natured, tolerant and friendly, he nevertheless held firm and shrewd views. Had he come back to us safe and sound, he would have been a tower of strength in the changing world of medicine which is upon us.

The OBE has been awarded to Major N. B. HALL, MB ADELAIDE, RAMC, for gallant and distinguished services in the field.

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Notes and News

Royal College of Surgeons of England

On Tuesday, March 14, Mr. J. Leigh Collis will deliver a Hunterian lecture on the aetiology of cerebral abscess as a complication of thoracic disease. On Tuesday, March 21, Mr. Geoffrey H. Bourne, D SC, will speak on bone formation, and on Thursday, March 23, on vitamin C and the regeneration of bone. Prof. Arnold Sorsby will lecture on blindness in childhood on Tuesday, March 28, and on the sulphonamides in ophthalmology on Thursday, March 30. All the lectures will be held at the college in Lincoln's Inn Fields, London, W.C.2, at 4 PM. They are open to medical practitioners and advanced students

Conference on the Health Services

The Health Workers' Council and the Social Security League are holding a joint conference on this subject at the Conway Hall, Red Lion Square, W.C.1, on Sunday, March 12, at 3 PM. The speakers are to include Dr. Horace Joules and Dr. Haden Guest, MP.

Royal Society of Tropical Medicine and Hygiene

A meeting will be held at 26 Portland Place, London, W.1, on Thursday, March 16, at 3 PM, when Air-Commodore T. C. Morton will speak on heat effects in British personnel in Iraq.

Medical Society of London

At a meeting at 11, Chandos Street, W.1, on Monday, March 13, at 4.30 PM, D. C. J. C. Brotton, Mr. R. H. Franklin, Dr. Ronald Jarman, and Dr. Keith Simpson will open a discussion on the dangers and difficulties of intravenous therapy.

Tuberculosis Association

At a meeting to be held at 26, Portland Place, London, W.1, on Friday, March 17, at 3.15 PM, Dr. Wilfrid Gaisford, Dr. W. F. Richards, Dr. Margaret Macpherson and Dr. George Jessel will open a discussion on the problem of primary tuberculosis in children, especially in the under 5 age-group.

Chadwick Lecture

On Tuesday, March 14, at 2.30 PM, at the London School of Hygiene, Keppel Street, W.C.1, Dr. S. A. Henry will deliver a Chadwick lecture on medical supervision in industry in peace and war.

Royal Society of Medicine

A meeting of the section of psychiatry will be held on Tuesday, March 14, at 2.30 PM, when Dr. Hubert Norman will read a paper on the relation of mental disorder to events in history. On the same day, at 4.30 PM, at the section of experimental medicine and therapeutics, Dr. F. O. MacCallum, Dr. A. M. McFarlan, Major James Marshall and Colonel T. Badger, USAMC, will open a discussion on the aetiology of infectious jaundice. Cases will be shown at the meeting of the section of dermatology on March 16, at 5 PM. On March 17, at 4.45 PM, there will be a discussion at the section of radiology on radiology in the diagnosis of colonic disease. The opening speakers are to be Dr. Walter Coldwell, Dr. Geoffrey Evans, and Mr. Lawrence Abel. At 5 PM, on the same day, at the section of obstetrics and gynæcology Mr. Victor Bonney and Dr. R. T. Brain will open a discussion on chronic vulval skin lesions.

Medical Casualties

The following casualties among medical officers have been announced :

Killed.—Captain J. F. V. Lart, MB CAMB., RAMC.

Died.—Major S. W. H. Askari, MB EDIN., IMS

Prisoners of War.—Major P. M. Bloom, MB CAPE TOWN, RAMC; Lieut-Colonel G. S. Chawla, MD ST. AND., IMS; Lieutenant P. T. Chopping, MRCS, RAMC; Captain J. F. Clark, LRCPE, RAMC; Captain E. K. Cruickshank, MB ABERD., RAMC; Captain H. E. De Wardener, MB LOND., RAMC; Captain J. Diver, RAMC; Lieutenant R. G. Drummond, MB EDIN., RAMC; Major Eugene Egan, MB NUI, RAMC, Major G. O. Gauld, MRCS, RAMC; Captain G. A. F. R. Gibson, MB EDIN., RAMC; Major S. A. Hasan, MRCS, IMS; Captain Calman Hecht, MB GLASG., RAMC; Captain N. G. Latey, MRCS, IMS; Captain R. W. Lennon, LRCPI, RAMC; Captain J. C. McNeilly, MB DUBL., RAMC; Captain J. E. Moss, MB BELF., RAMC; Major K. Rai, MRCS, IMS; Major K. N. Rao, IMS; Lieutenant J. C. T. Sykes, MB LEEDS, RAMC; Captain E. D. H. Williams, MB LOND., RAMC.

Wounded.—Lieut.-Colonel S. T. Davies, MRCS, IMS; Major Frederick Elliott, MB DURH., RAMC; Lieut-Colonel V. E. M. Lee, LRCPI, IMS; Captain E. M. Leyland, MB EDIN., RAMC; Major A. A. C. Ross, MB EDIN., RAMC.

Secretary of British Medical Association

The council of the BMA has appointed Dr. Charles Hill to succeed the late Dr. G. C. Anderson as secretary.

Dr. Hill, who is 40 years of age, was educated at St. Olave's School, Trinity College, Cambridge, and the London Hospital. After qualifying in 1927 he held resident posts at the London Hospital and was London University extension lecturer in biology and deputy medical officer of health for Oxford. Appointed to the association's staff as assistant secretary in 1932, he became deputy secretary three years later. He is chairman of the Central Council for Health Education and a member of the Minister of Labour's Industrial Health Advisory Committee.

Almoner at the London Hospital

On March 1 the governors of the London Hospital decided to establish an almoners' department.

The appointment of Surgeon Vice-Admiral Sir SHELDON DUDLEY as medical director-general of the Navy has been extended for a year from July 2, 1944.

On Friday, March 17, at 4.30 PM, Mr. L. V. Cargill will speak to the clinical society of the Royal Eye Hospital, London, S.E.1, on Sir William Bowman.

Dr. H. G. Massiah has been appointed a member of the legislative council of the Island of Barbados.

Appointments

COOPER, D. M., MB LOND., FRCS.: acting hon. asst. surgeon to the Woolwich and District War Memorial Hospital.

*HOAHING, MARTHA H., LRCPE: MOH to the Colonial Service in Trinidad.

WARD, P. M., MD LOND.: area asst. TO, Welsh National Memorial Association.

* Corrected notice.

Births, Marriages and Deaths

BIRTHS

ADENEY.—On Feb. 19, at Buhiga, Ruanda, the wife of Dr. Harold Adeney—twin sons.

DUMMER.—On Feb. 28, at Ashwell, Herts, the wife of Captain F. H. M. Dummer, RAMC—a son.

ESTCOURT.—On Feb. 29, at Eastbourne, the wife of Major H. G. Estcourt, RAMC—a son.

HILL.—On March 1, in London, the wife of Group-Captain J. Hill, MB, RAF, of Cobham—a daughter.

HODGSON.—On Feb. 22, at York, the wife of Major G. A. Hodgson, RAMC—a daughter.

HUMPHRIS.—On Feb. 29, at King's Lynn, the wife of Dr. J. H. Humphris—a son.

MORE.—On Feb. 27, the wife of Dr. Ian More, of Lacock, Wilts—a daughter.

ROSS.—On Feb. 29, at Luton, the wife of Dr. Thomas Ross—a daughter.

MARRIAGES

BARER—BRIGGS.—On March 4, at Watford, Robert Barer, lieutenant RAMC, to Gwenda Briggs, MB.

JEFFERISS—GREEN.—On March 1, at East Sheen, Frederick James Gordon Jefferiss, MRCS, squadron-leader RAFVR, to Phyllis Green.

MCCALL—PRICE.—On March 4, in London, Anthony McCall, MD, of Bournemouth, to Mayla Price née Mackenzie.

WEBB—KELLY.—On Feb. 26, in London, Roy Webb, surgeon lieutenant RNVR, to Mary Helen Kelly.

DEATHS

ARMITAGE.—On Feb. 28 at Salisbury, John James Armitage, MRCS, MRCOG.

COCKING.—On Feb. 29, at Barrow Gurney, Alfred Wilkinson Cocking, MRCS, surgeon commander RN, aged 51.

EASTES.—On March 4, at Gerrards Cross, George Leslie Eastes, MB LOND., aged 73

FLETCHER.—On Feb. 27, at Uckfield, Sussex, Canon John Rory Fletcher, MRCS, LSA, of Putney, aged 82, late Rector of the Catholic Church of St. Simon and St. Jude, Streatham Hill.

FROWEN.—On Feb. 28, at Burton-on-Trent, Fraser Frowen, MRCS, aged 81.

GRAHAM-STEWART.—On Feb. 27, in London, Alexander Graham-Stewart, MB ABERD.

GRIFFITH.—On March 5, in London, Arthur Donald Griffith, MB LOND., FRCS, ophthalmic surgeon to Westminster Hospital and senior surgeon to the Royal Eye Hospital, Southwark.

HILL.—In February, Sir Norman Gray Hill, Bt., MC, MB LOND., DPH, lieut.-colonel RAMC, aged 49.

MAUDSLEY.—On March 5, at Melbourne, Sir Henry Carr Maudsley, KCMG, CBE, MD LOND., FRCP, consulting physician to the Melbourne Hospital.

MEIKLEJOHN.—On Feb. 19, Sophie Jean Meiklejohn, MB ABERD., founder of the Chilubi Hospital and of the Leper Settlement, St. Margaret's, White Fathers Mission, Northern Rhodesia.

RIDEWOOD.—On Feb. 27, at Churchfields, South Woodford, Vivian Ernest Ridewood, BA LOND., MRCS.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export.

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SURGERY IN THE FIELD

GUY BLACKBURN, M CHIR CAMB, F R C S
MAJOR RAMC; SURGEON TO A FIELD SURGICAL UNIT

I—Abdominal Wounds

IT has long been recognised that the success of surgery in forward areas depends on getting the surgeon as far up as circumstances allow and bringing the wounded man back to him as quickly as possible. Putting this principle into practice has decreased the mortality-rate of abdominal wounds more than any other single factor; but much has also been achieved by chemotherapy, improved methods of resuscitation and better after-treatment.

There remains a high proportion of cases, perhaps 40%, which fail to respond to any form of treatment and die. Inflammatory conditions, whether peritonitis in the abdomen or postoperative pulmonary infection, still account for most of the deaths, and the best prospect of progress lies in their control.

The fact that we are dealing with hollow viscera will always leave the onus on the surgeon. It behoves him therefore to choose the right moment to operate, to lose no time in doing what is necessary, and to help, not hinder, the man in the vital 10 days or so following his operation. The last perhaps is the hardest task, but the decision to operate—when and how—can at times be difficult.

Measures of resuscitation may restore the blood-pressure without slowing the pulse at all, especially where there is severe mesenteric bleeding. It is here, of course, that blood is vital and plasma is no alternative. Two pints will usually produce the improvement required before operation. Generally, it is courting disaster to begin with a systolic pressure of less than 90 mm. Hg, but it is courting death not to begin at all. At times an unexpected reward will be gained in an apparently hopeless case. Hæmostasis, once the abdomen is opened, combined with further transfusion, will then allow of any major surgical procedure required.

A man was wounded by a machine-gun in the left loin and seen 4 hours after injury. Laparotomy was undertaken with a blood-pressure of 85/60, which rose to 100/70 as soon as the renal pedicle had been ligated. The lower pole of the kidney was loose in the abdomen and the upper pole still attached to the renal vessels. Multiple perforations of the jejunum demanded a resection of 6 in. of gut with end-to-end anastomosis and the patient made a good recovery.

Coincident wounds add to the difficulties in these cases—for the single abdominal wound is the exception. Abdominothoracic, buttock and loin wounds may indeed all require laparotomy. It is important to be able to distinguish the rigidity of thoracic and other wounds in which laparotomy may be positively harmful. The value of diagnostic exploration in such cases has, in my view, been too often exaggerated. The procedure itself seldom endangers the patient's life, but it adds one more to the number of his wounds and immobilises him for 10 days at least. This is undesirable at busy times and reflects bad surgical judgment in quiet ones, when detailed observation from hour to hour could have prevented it. In a small percentage of cases a diagnostic laparotomy is required, but the incision should be a very small one, just below the umbilicus.

The differential diagnosis between true abdominal rigidity with intraperitoneal injuries and the false rigidity of extra-abdominal lesions will be discussed in connexion with war wounds of the chest, which present the greatest difficulty. In rare instances, however, wounds of the buttock and flank are deceptive. One such tangential wound missed the peritoneum and produced a partial tear of the ureter with a fistula that took several weeks to heal; many another has actually exposed intact peritoneum. It can be taken as a working rule, however, that an abdominal wound inside the linea semilunaris means an intraperitoneal lesion.

It is a commonplace that the size of the entry wound bears no relation to the internal damage, but the site is important; and, as Abadie has shown, wounds in the left hypochondrium and hypogastrium are the most serious, if only from the presence of the large gut. The two flexures are rarely involved, the right being protected by the liver, the left by the spleen. When the spleen itself is grossly damaged, the splenic flexure may also be implicated, and the prognosis is then very bad.

WOUNDS OF THE LARGE GUT

For physiological reasons wounds of the large bowel are much more dangerous than those of the small; for anatomical reasons they are the graver if only because of the difficulty of access and mobilisation. Exteriorisation and colostomy is the guiding principle in dealing with wounds of the colon, and colostomy alone with those of the rectum and anus. Excision of the coccyx and the perineal approach are rarely required for the arrest of hæmorrhage, though used occasionally with great success; they may be needed at a later stage to provide adequate drainage of infection in this region.

Wounds of the pelvic colon and rectum are often associated with vesical injuries, and the value of catheterisation before anæsthesia in these, as in all wounds of the abdomen, cannot be exaggerated. It should, in fact, be an inviolable rule to pass a catheter before laparotomy, and before dealing with wounds of the loin that may lead to the kidney.

The right half of the colon, on the other hand, is liable to be injured at the same time as the terminal ileum or the stomach. Abdominothoracic injuries may be associated with wounds of the transverse colon, which may or may not require transverse colostomy, depending on the site of perforations. If these are too proximal to allow of it, intraperitoneal suture may at times be preferred to exteriorisation. Single perforations of the cæcum fall into this category, recovery being the rule in the absence of peritonitis at the time of operation. Even multiple perforations of the ascending colon and right half of the transverse colon have likewise done well, in my experience, after simple intraperitoneal suture with only the omentum to cover the sites of repair.

Ileocolic resection is a formidable procedure and best avoided if exteriorisation can solve the problem. One patient, for whom it was imperative, died after 28 days: another, who had ridden a motor-bicycle 3 miles after division of his terminal ileum and tearing of the mesentery and superior mesenteric vessels, only survived 24 hours after operation. One of these patients had extensive retroperitoneal bleeding and what has been called the "retroperitoneal syndrome." This term, however, is hardly necessary or useful. I saw the clinical picture only twice in over 1000 cases.

The type of colostomy in these injuries deserves mention. Apposition by suture of the two loops and obliteration of dead space on the lateral side are both valuable precautions. They make subsequent closure easier and reduce the risk of internal hernia.

WOUNDS OF THE SMALL GUT

Single-layer suture of small-gut wounds should suffice as a rule, but I make anastomosis two-layered. The time taken in completing the second layer is negligible in comparison with the advantage that may be gained. I give ascorbic acid as a routine after operation, just as it is given after gastric anastomosis or resection in patients in civil life.

To decide between suture and resection does not ordinarily present any difficulty, the state of the mesentery and the probable size of the lumen after repair being the important determining factors. Resection may often be the shorter procedure and time spent in assessing doubtful viability may be saved if numerous perforations above or below demand excision in any event. Whether to drain after these or other operations should not be hard to decide, the only absolute indication for drainage being the presence of bile in the peritoneum if there is injury to some part of the biliary tract. Drainage of wounds of the pancreas is also essential. In all other cases drainage of the abdominal cavity is useless, though drainage of the wound, if much soiled, may be very useful.

Here, as elsewhere, associated injuries often determine the issue, and bleeding from branches of the iliac vessels or veins of the posterior abdominal wall may well prove decisive. It is well known that a large hæmoperitoneum may be found without visceral injury; conversely, there may be extensive visceral damage with little bleeding or free fluid.

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It is always more satisfactory to find and deal with visceral injuries than to find only blood, because a proportion of the latter cases show some visceral injury at autopsy. Others, however, can be easily explained by bleeding from the deep epigastric vessels or vessels of the abdominal wall.

The discovery of foreign bodies in these cases is of little importance. They may be difficult to locate in the posterior abdominal wall, and time spent in searching for them is wasted. They may also be difficult to distinguish from fragments of bone, where part of the spine or pelvic girdle has been fractured in the track. One such case illustrates well the importance of position at the time of injury.

A man lying flat behind a closed workshop door was injured by aerial machine-gun fire, which penetrated the door before injuring him. A large entry wound, half-way down the posterior aspect of the thigh, led to a fractured ischial tuberosity. The abdomen was not rigid and the man's general condition was excellent after simple resuscitation. The wound was dealt with at operation 2 hours after injury and no track was found beyond the fragments of ischium. The patient, moreover, appeared well 12 hours later at the time of evacuation. On arrival at a hospital 60 miles away, the abdomen was rigid, and he had tachycardia; laparotomy revealed a large foreign body, lodged in the ischium, with 2 in. projecting through the pelvic floor. There was blood in the peritoneal cavity but no visceral injury. The foreign body was removed and he made a good recovery.

Wounds in the pelvic and shoulder-girdle regions should, in fact, be presumed to have penetrated the underlying cavity until or unless there is some convincing evidence to the contrary.

WOUNDS OF THE GENITO-URINARY TRACT

Genito-urinary wounds account for no more than 2% of a series of 1000 battle casualties. Coincident injuries usually determine the prognosis: 4 cases only have required primary nephrectomy and in only 1 of these was the kidney the only viscus injured; the liver, jejunum and spleen were damaged in the other 3, but all made a successful recovery. Wounds of the bladder have not proved so favourable; cystostomy has twice been required in multiple perforations of the ileum, and only one of these patients survived. He had machine-gun wounds of the ileum, bladder and rectum, seen at 4 hours; and though needing both cystostomy and colostomy he recovered after a stormy convalescence.

Cystostomy, apart from these injuries, has been required in cases of paraplegia and two injuries of the urethra, one with a fractured pelvis. Such injuries present difficulties when they get further back: urology at advanced operating centres is necessarily elementary.

AFTER-TREATMENT

Measures to prevent the onset of ileus are part of the postoperative care of abdominal wounds—morphine every 4 or 6 hours, until auscultation reveals intestinal sounds; venoclysis with little or nothing by the mouth for 48 hours at least; continuous gastric suction and sulphadiazine in the intravenous drip (6 grammes daily). This should not, however, become a fetish, since a rigid routine, though convenient for the nursing staff, sometimes reflects unpardonable lack of imagination. Each case has to be treated on its merits, and to refuse all fluid by mouth to a man with a single wound in the terminal ileum, seen at 4 hours, would be as ridiculous as to refuse it to a patient after simple appendicectomy. Prophylaxis has its place, but there should be room for variation in its execution and patients should be allowed from time to time to get better "in spite of the doctor."

Invariable use of tension sutures in the upper abdomen, provision of an attractive diet to a man in the field, skill and care in nursing, and the will of the man himself—all these count for a great deal. The knowledge that he is not to be moved for 10 days after operation may help materially. Even when he is evacuated, slow stages and comfort should be the rule and train is by far the most comfortable method. Anyone who has ridden 50 miles in an ambulance or in an air-ambulance on a windy day will agree. Patients with abdominal injuries do not travel well by air.

RESULTS

With ileus, peritonitis and postoperative pulmonary complications as the chief causes of death in the days following operation, it is clear that the interval between wounding and operation is vital. An all-in mortality of 50% was my experience in cases received 10–12 hours after injury. With a decrease in the time-lag there should be a decrease in mortality. These figures however are not conclusive. The rejection-rate, representing men with abdominal wounds too ill for operation, must be taken into account. I encountered 2 such cases among 50 abdominal wounds and both had wounds of the large gut 36 hours old; both died within 6 hours of arrival.

I have twice resected bowel in the presence of obvious peritonitis; and 1 patient, seen 15 hours after injury, survived a week after ablation of 54 in. of gut. He died of peritonitis which would have killed him much more rapidly if no operation had been done.

Gas gangrene in the abdominal wall occurred only once, following a Paul-Mikulicz exteriorisation of a wound of the pelvic colon. It was rapidly fatal.

These figures relate to injuries of the alimentary canal; the series of laparotomies does not include wounds of the liver for which the abdomen was not opened. Conservative measures have always been adopted where the presence of a second intraperitoneal lesion was regarded as unlikely—e.g., abdominothoracic wounds on the right side. Bile may continue to escape from the wound long after injury, but this is not of serious significance.

CONCLUSIONS

There is room for improvement in the results of abdominal surgery in the field. Adequate surgical treatment at the outset is essential.

Blood-transfusion is invaluable for cases of bleeding from the mesentery. In restoring the patient's general condition it does not necessarily slow his pulse.

Diagnostic laparotomy adds one more to the list of the man's wounds. If it must be undertaken, let the incision be a small one.

Retroperitoneal hæmorrhage is serious but rare. Fractures of the pelvic girdle produced by missiles may well lead into the peritoneal cavity. Genito-urinary injuries are, in themselves, easy to deal with in forward areas. Wounds of the liver do better without an operation. It is usually a waste of time to search for foreign bodies in the abdomen.

In after-treatment, routine ("by numbers") must not be overdone. Evacuation should be postponed for 10 days, and air transport should be avoided.

II—Abdominothoracic and Thoracic Wounds

The operations required by these wounds, in forward areas, include some of the most extensive and also some of the simplest in surgery. Where adequate tissue is available there is nothing simpler than the closure of a sucking wound, and it is much better closed by suture than by means of a dressing or pack and strapping. The time taken and disturbance to the patient are trivial when set against the relief. Skin, of course, is never sutured and the removal of air or fluid or both is a usual sequel. Where loss of tissue makes operation difficult the firm dressing is adequate for a time, but it is likely to allow more leakage on the 2nd or 3rd day than is seen after closure by simple surgical methods.

ABDOMINOTHORACIC WOUNDS

Wounds of the lower chest, with or without penetration of the diaphragm, present some of the prettiest problems of diagnosis and treatment in the field. Their management at centres in front of the casualty-clearing station is hampered by lack of radiography, but with the aid and advice of a physician this should not be an insuperable obstacle.

The first task is to decide whether the injury involves the peritoneal cavity. The rigidity of the purely thoracic injury is more obviously unilateral, less definite on inspiration, and unaccompanied by vomiting. The patient with an abdominothoracic wound presents a picture of shock and respiratory distress; the man with the thoracic wound may have more distress but very

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seldom so much shock. (Obviously this rule cannot cover all cases, for the factor of hæmorrhage may be predominant; but even then intrathoracic and intraperitoneal bleeding should not be unduly difficult to distinguish.) In doubtful cases rigidity is the key to diagnosis and the effect of aspiration of fluid from the chest on the rigidity may well be decisive.

Sometimes, of course, the presence of an intraperitoneal lesion is so obvious that the surgeon's course of action is clear. It differs, however, for abdominothoracic wounds on the right and left side, and results are different also.

Wounds of the right side often involve the liver only, and laparotomy is not required. It suffices, in fact, to close the chest wound from above, remove any foreign body felt through the hole in the diaphragm, and treat the hæmopneumothorax in the ordinary way afterwards. Where, however, there is possible injury to abdominal viscera other than the liver, laparotomy may be needed. The duodenum and gall-bladder have been found injured, the former leaking frothy bile-stained chyme, which is characteristic. The stomach too may be injured and if an anterior perforation is found it is wise to open the lesser sac and be sure that there is no corresponding posterior injury. In cases of this type, with combined wounds of the liver and a hollow viscus, drainage of the peritoneal cavity is usually advisable. The defect in the diaphragm is not serious, since the liver prevents the development of a diaphragmatic hernia. Temporary phrenic paralysis is therefore not required.

Left-sided abdominothoracic wounds differ from those of the right side not only because diaphragmatic hernia is a real danger but because the spleen may be injured. Splenectomy has to be done quite often in these cases and in my experience carries a mortality of 50%. It may be performed through a separate laparotomy incision but it as easy by the transdiaphragmatic route. The pedicle can be controlled without difficulty from above, and the saving of time and avoidance of a second incision may be greatly to the patient's advantage. It is clear, however, that these injuries cannot always be dealt with from above, especially when the hole in the diaphragm is difficult of access.

Such was the case in a man admitted 8 hours after wounding by a rifle, with an entry wound 1 in. below the nipple and an exit wound in the left loin. Exploration of the upper wound revealed a small hole in the diaphragm with a grossly distended stomach herniated through it. He was, in fact, suffering from a strangulated diaphragmatic hernia. The passage of a stomach-tube deflated the stomach somewhat, but reduction was not effected without laparotomy. Grazing of the pericardium and lower lobe of the lung were the only intrathoracic lesions, with very little bleeding from either, but the abdominal damage included a severe rupture of the spleen and perforation of the splenic flexure, which required exteriorisation. It is not surprising that the patient survived only 24 hours.

The nature of the diaphragmatic defect also affects the symptoms. The patient just described complained of severe pain, especially on inspiration; another, with only omentum herniated, had pain in the left shoulder. Closure of the defect at the end of operation is naturally important, especially where the wound has been radically enlarged to allow approach from above. Temporary phrenic paralysis—by crushing the nerve, usually by ligature with thread, as it lies on the pericardium—is an obvious corollary. It makes closure much easier.

Later results of course do not come within the scope of this paper but I may record that traumatic diaphragmatic herniæ following operations of this type have been seen in 2 prisoners-of-war. One had an associated low-grade peritoneal infection which proved fatal: the other seemed to be little inconvenienced by what was undoubtedly a large defect. This no doubt required fascial repair later.

Observation of these cases at special centres further back would bring out many other points—the incidence of empyema, delayed reexpansion of the lung, and the relative value of various types of diaphragmatic repair. The forward surgeon's problem is to tide over the initial phases and evacuate the patient 10 days or so after operation. He may, in this period, require one or more aspirations. Transfusion is often a vital part of the initial resuscitation, but blast injury of the lungs is not uncommon in these cases and there is risk of pulmonary œdema if intravenous fluid is given in excess. It is easy to pay undue attention to the abdominal wound to the detriment of the thoracic.

As in all war wounds, coincident injury will often weigh the scales, but in my belief abdominothoracic wounds are not prognostically more serious than abdominal. The right-sided ones, requiring thoracic exploration only, make up for many disappointments on the left side.

For example, a man was admitted 15 hours after a through-and-through shell-wound of the right lower costal margin. He was shocked and almost pulseless and liver tissue could be seen in the wound. The outlook seemed hopeless, since his dyspnœa was extreme and pallor from blood loss striking. The sucking wound was rapidly closed and blood-transfusion started at once. Four weeks later he left the CCS for a general hospital with a biliary discharge from his lower wound still containing necrotic liver tissue from time to time; his general condition was excellent and recovery seemed assured.

A parallel case of a man seen 12 hours after a similar wound ended less happily. Below-knee amputation had to be performed for an extensive wound of the right ankle after closure of a sucking right-sided abdominothoracic wound. A large foreign body had been removed from the liver through a diaphragmatic defect. All seemed well at the end of a week and the amputation stump was healthy. Septicæmia then supervened from the liver wound and he died 5 days later. Autopsy showed both wounds (amputation and thoracic) clean and healing, but the cavity in the liver was obviously infected and the source of the septicæmia. Routine chemotherapy had of course been given after operation, but without avail.

CHEST WOUNDS

These fall into two classes—those of the chest wall and those involving the pleura. The former demand treatment on the same principles as soft-tissue wounds elsewhere. The latter require surgery only when "sucking." This is particularly true of the small through-and-through wound, where meddlesome surgery may only succeed in reopening a pleural defect already naturally sealed. Aspiration of blood from the pleural cavity is often the only measure necessary before the patient is evacuated, and it can usually be undertaken safely if he is not dyspnœic when at rest in bed.

The importance of sitting these patients well up in bed, the value of continuous oxygen through the BLB mask or some other device, and the inadvisability of more than a small dose of morphine are all well known. More often forgotten are the facts that tension pneumothorax is not uncommon, that a large hæmothorax in the absence of intercostal bleeding is rare, and that slow transfusion a few days after injury is extremely valuable.

Surgical emphysema may at times be alarming.

A man was admitted 24 hours after being crushed, without an external wound, but with obvious rib injury below the angle of the scapula. The broken rib was strapped without delay, but progressive surgical emphysema developed in the chest wall over a total pneumothorax. Aspiration of air under pressure from the pleura produced little change, and the emphysema reached the face, wrists and scrotum within 48 hours. Rib-resection under local anæsthesia was then done and the fragment of rib projecting into the pleura removed. Recovery was uneventful.

Another man was admitted 36 hours after injury with a penetrating wound of the chest, which had been dressed with soft-paraffin gauze and strapped. Massive surgical emphysema developed without an underlying pneumothorax. Rib-resection was required for relief of symptoms, and a circular central perforation of the rib, with adherent pleura below it, proved to be the cause of the emphysema.

The rarity of a large hæmothorax, already mentioned, is related to the low systolic and diastolic pressures in the pulmonary circulation and the natural elasticity of the lung. This elasticity also explains the absence of bleeding from small wounds of the lung during the thoracic approach to abdominothoracic wounds. Bleeding from intercostal vessels, on the contrary, can be severe, and its arrest is vital.

This was well seen in a man 10 hours after a shell wound in the loin with gross damage to the kidney. The wound was not bleeding at operation, but hæmorrhage from the inter-

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costal vessels had obviously been considerable. After resection of the injured rib, and nephrectomy, recovery was uneventful.

AFTER-TREATMENT

The care of these patients after operation is a task for the physician and surgeon in collaboration. If X-ray facilities are at hand, they are invaluable.

The proportion of bloodstained effusions which become frank empyemas has been put as high as 25%, and intercostal drainage in these cases is only the preliminary to rib-resection. It may not be long before these two stages in the operation become one, with the aid of penicillin, but such an operation is outside the sphere of forward surgery. So too, in all but the rarest cases, is removal of foreign bodies from the lung. Removal should, however, clearly be undertaken as soon as circumstances allow, and the tendency to hold these patient in forward areas out of interest or until they are "dry" is one that should be forcibly discouraged. Large foreign bodies, particularly in the hilum, can do irreparable harm in a relatively short time.

Other postoperative difficulties are connected with atelectasis and failure of the lung to expand again, especially where aspiration has been inefficient or unduly delayed. This again concerns the specialist into whose hands the forward surgeon should deliver the patient as soon as he is fit for the journey. Secondary hæmorrhage and late hæmoptysis are also unimportant in the early phases of treatment.

Elementary breathing exercises, and daily active movements of the arm and shoulder on the affected side, can both be very useful, especially the latter when the soft tissues of the arm have been damaged by the missile penetrating the chest. In cases of coincident fracture of the humerus or scapula the thoracobrachial plaster or a modification of it may seriously interfere with the movements; but that is inevitable.

Finally it may fairly be said that the results of immediate surgery in patients with chest wounds who survive to reach an advanced operating-centre are extremely good, a case-mortality of less than 2% being the general experience. Abdominothoracic wounds, on the other hand, show a mortality akin to that of all abdominal wounds in the field.

CONCLUSIONS

Sucking wounds of the chest are more satisfactorily closed by surgical means than by strapping over soft-paraffin gauze.

The abdominal rigidity of pure thoracic wounds is distinguishable from that of abdominothoracic injuries. In doubtful cases examination after paracentesis thoracis is often conclusive.

Right-sided abdominothoracic wounds are prognostically less serious than left. Diaphragmatic hernia and splenic injury are common on the left side. Temporary left phrenic paralysis is helpful in the management of left-sided abdominothoracic wounds, and transdiaphragmatic splenectomy is no more difficult than transperitoneal.

Through-and-through wounds of the chest should be treated conservatively.

Tension pneumothorax is not uncommon in injuries of the chest. Intercostal bleeding may easily be more serious than bleeding from the lung. Surgical emphysema rarely demands surgical treatment.

The immediate mortality of wounds of the chest reaching an advanced operating-centre is very low.

III—Wounds of the Extremities

In treating limb wounds the interval between wounding and operation, and the type of missile are the most important factors to be considered. The general principles, however, are common to all types—debridement, because true excision is rarely advisable or possible; counter-incision or drainage after removal of foreign bodies; immobilisation; chemotherapy; and prophylactic serum where indicated. In most cases epithelialisation over granulation or scar tissue will eventually be required and the forward surgeon, in his wound toilet, should bear in mind the question of secondary suture at the base hospital. Extravagant skin excision is as much a surgical crime as inadequate fascial incision to relieve tension or incomplete removal of obviously dead muscle. This last is often difficult in penetrating wounds of fleshy areas, such as the buttock and thigh, but care in its execution will be well repaid.

In this connexion it is well to remember that the removal of foreign bodies is not the task of the surgeon in the field. True, he will find that with experience he misses fewer of them; but it is no disgrace to leave them behind provided their calculated lodging-place is adequately drained. This will involve removal of pieces of battledress, dirt and dead muscle from the wound in many cases, and of completely loose fragments of bone in others. The removal of bone fragments with any tissue attached to them is not, however, justifiable, and difficulty in distinguishing the foreign body from a broken piece of bone is no excuse for enthusiastic and optimistic removal of unnecessary fragments. It is frankly impossible at times to distinguish between the two.

It follows that the localisation of foreign bodies by X rays has no place in forward areas; and in most cases radiography of fractures is also unnecessary. Immobilisation, not alignment, is the surgeon's business at this level, and operation will nearly always reveal bone injury not detected by clinical examination. This does not apply of course, to penetrating or even perforating wounds of joints. Anteroposterior and lateral films will at least give some idea of the position of a foreign body in a joint; and if its removal has to be undertaken they will be invaluable. But removal of foreign bodies from joints should seldom be undertaken in the field, if only because of the risk of sepsis. Evacuation to an orthopædic unit, where possible, is obviously preferable.

The high incidence of fractures in limbs has led to the evolution of almost standard methods of immobilisation for transport purposes. These play no part in definitive treatment, so there should be the least possible delay in evacuating the patients to hospitals where this can be undertaken. Long ambulance journeys may be required—if need be in stages—and the forward surgeon must apply a plaster or splint that is not only comfortable but stable. Splitting of all plasters, without exception, is necessary, and firm fixation to the stretcher, where indicated (as in the Tobruk plaster), is equally important. All plasters should be padded and circular bandages or dressings should never be applied beneath them. Even the practice of putting on wet bandages beneath plaster is not safe.

The application of tight bandages or dressings for hæmostasis should not worry the surgeon in forward areas. It is done before he sees the patient—at the advanced dressing-station or regimental aid-post. There the application of tight field dressings or tourniquets may well be both necessary and difficult. Much harm can be done, and it is one of the hardest tasks of the medical officer.

A man had a shell-wound of the axilla involving the third part of the axillary vessels. In an endeavour to stop the bleeding a field dressing was applied so tightly that he had a well-developed ischæmic contracture of the forearm and hand when seen at an operating-centre 8 hours later. Gas gangrene was also evident in a large and dirty wound below the first, and amputation had to be performed.

Tourniquets applied too loosely are worse than useless: the resulting venous engorgement of the limb is no aid to the surgeon at the operating-centre.

The fact that a wound near a large vessel is not bleeding does not mean that the vessel is intact. Skin discoloration, and obvious blood-clot extruding from a tiny wound, may be the only sign of underlying vascular injury and even complete division. Damage to blood-vessels accounts for many of the deaths from wounds of the extremities; wounds of the axilla and upper third of the thigh feature most prominently. Fracture of the femur, especially in the upper third, is of course associated with severe shock, and many pints of blood or plasma may be required before immobilisation under anæsthesia can be considered in these cases. The value of simple methods of resuscitation (warmth, morphine, and desoxycorticosterone acetate) cannot be overemphasised. There is not as a rule any pressing hurry to apply a cast for immobilisation, and time spent in restoring the patient's general condition is well spent.

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Occasionally continued bleeding will demand operation as quickly as possible, but these cases are not difficult to spot.

Multiplicity of wounds, with double or even treble fractures, may add to the surgeon's problems; but wounds of the extremities are on the whole the easiest of all to treat in the field.

To decide on the advisability of immediate amputation may, of course, be hard; in choosing the site of amputation it is clearly a good principle to leave as much bone as possible, since a second amputation can always be carried out further back if sepsis or other considerations demand it. In forward areas this conservative principle may be difficult to follow; this is not to say that guillotine or flapless amputations have little place in forward surgery. It does not take long, in most cases, to make flaps and suture them loosely over soft-paraffin gauze. I have found two half-strips of gauze more satisfactory than one whole one, and no more than 4 or 5 sutures are necessary, even with an above-knee amputation.

Nowhere is it truer than in dealing with gross injuries demanding amputation, that each case must be treated on its merits and on elastic principles. Loss of skin alone may have already determined the shape of the flaps, and vascular injury have delineated the site of bone division. Fractures and coincident nerve injuries may likewise have to be taken into account.

Much has been written about the subsequent progress of these cases, and sepsis in the flaps has been widely discussed. This may be altered by penicillin in days to come, and secondary suture may become a routine with these as with some soft-tissue wounds. Even in present circumstances, of course, it is practised with success from time to time. In 2 cases 24 hours old, requiring above-knee amputation for gas-gangrene, the flaps were sutured as loosely as possible and at least 10 in. of femur was left in each case. This would have allowed a margin for reamputation, but as events turned out one stump healed after removal of the soft-paraffin gauze and the other required three or four additional sutures. Both wounds, in fact, were dry within 4 weeks of amputation.

GAS GANGRENE

The value of prophylactic gas-gangrene serum in adequate dosage (16,500 units) is established. Similarly adequate therapeutic dosage combined with chemotherapy is needed in treatment. Intravenous penicillin may well revolutionise the after-treatment but no form of therapy can ever replace extirpation of the infected and dead tissue as the initial procedure. The surgeon who in dealing with gas gangrene is sparing with the knife, or mindful of cosmesis, has no place in the field.

WOUNDS OF THE UPPER LIMB

Wounds of the axilla and shoulder region are perhaps the most difficult to deal with in forward areas, especially when there is a chest wound as well. The thoracobrachial plaster as a standard means of immobilisation seems to have solved the problem of wounds of the shoulder-joint and its adoption in place of the U-plaster for fractures of the humerus has made for greater comfort in transport. Whether such a plaster should be applied at the initial wound toilet or not is debatable. With a shoulder-rest, and the patient under general anæsthesia or simple brachial-plexus anæsthesia, it can of course be put on then; but plexus anæsthesia is time-consuming and not always satisfactory. The alternative is application of the plaster the day after operation, with the patient sitting on a stool.

With fractures of the forearm and hand it is as vital to split the plaster as it is with fractures of the lower limb. The arm, in fact, is often more dependent than the leg during evacuation by ambulance. When there has been vascular injury, plaster is best avoided altogether. Splinting for coincident nerve injury must sometimes be taken into account.

The superficial position of the brachial artery in the arm and antecubital fossa often results in its injury at these two sites, and associated ulnar or median nerve lesions are not uncommon. If these are incomplete the course of action is clear; if complete, primary suture should never be attempted, a single stitch to appose the two ends of the divided nerve and facilitate exposure at the operation for secondary suture being all that is required.

It is not, however, injuries of the brachial vessels that present difficulties in the field—the anastomosis round the elbow-joint notwithstanding. It is rather wounds of the axillary and (rarely) subclavian vessels. These can give rise to alarming secondary hæmorrhage later, if bleeding is not adequately controlled in the first instance. This is best done by ligature, but a pack removed in 24 hours or less has at times been deemed the wiser course. One patient, severely shocked by blood loss from such a wound, asked to be returned to his unit when the pack was removed the next day!

Abduction plasters no longer have any place in the early treatment of arm wounds. Full supination of the hand with double forearm fractures, and a neutral position with single forearm fractures, are generally approved. Fingers immobilised in full extension do badly; and separate bandaging of the fingers in wounds or burns of the hand is a useful rule. Amputation stumps require adequate fixation of dressings with adhesive plaster and adequate protection from chance injury on the journey. Application of a plaster-of-paris cuff may well be the best way to achieve this, though it does not seem to be always necessary.

WOUNDS OF THE LOWER LIMB

The Tobruk plaster, or a modification, is at present the generally accepted means of immobilising fractured femur for transport. Well padded and securely fixed to the stretcher it can certainly be very effective. It is not, however, ideal, since traction is rarely maintained throughout evacuation and rotation causes trouble. Each case needs individual attention, and initially secure fixation and padding of the foot and foot-piece can contribute to the patient's comfort. It is imperative to split the plaster round the limb. Many fractures of the upper and even middle third of the tibia travel better with a Thomas splint over their plaster, firmly anchored to the stretcher, from which the patient need not be moved during his journey.

In my experience arterial injuries in the lower limb are the most disappointing. Ligature of the popliteal vessels, especially, almost invariably leads to the need for above-knee amputation a few days later. Coincident wounds below the site of vessel injury are important. Once the artery—the popliteal, for example—has been tied, infection will advance apace in any wound in the ischæmic foot: the wound, in fact, assumes an importance out of all proportion to its extent and is a potential source of septicæmia. Does this, then, justify immediate amputation, seeing that waiting is dangerous?

Wounds of the femoral vessels below the profunda do not seem to be so uniformly disappointing, whereas wounds above it usually mean amputation above the knee, sooner or later. All this may appear in a different light when we have some anticoagulant or peripheral vasodilator which will restore the circulation in these ischæmic limbs.

CONCLUSIONS

Wound toilet in the field means debridement, not excision. Extravagant removal of skin is a surgical crime, and the localisation and removal of foreign bodies is not a prime object of forward surgery.

Immobilisation for transport is the sole object of treatment of open fractures in forward areas. The thoracobrachial and Tobruk plasters are the most satisfactory means of immobilising the humerus and femur respectively. All plasters should be split before a patient is evacuated.

Tourniquets and tight field dressings should be applied with great care.

Amputations in forward areas should preserve as much bone as possible. Flaps should be loosely sutured.

Radical extirpation is essential in the surgery of gas gangrene.

Hæmostasis in vascular injuries of the axilla is difficult to achieve, but vital. Coincident wounds below those requiring ligation of a main vessel are potentially very dangerous.

The discovery of an efficient peripheral vasodilator will be a milestone in the surgery of vascular injuries.

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ABSORPTION AND EXCRETION OF SULPHONAMIDES IN CHILDREN

MARGARET W. STANIER, B.A., B.SC. OXFD
THOMAS STAPLETON, B.M. OXFD

Department of Pædiatrics, Radcliffe Infirmary, and Department of Biochemistry, Oxford University

THE purpose of this paper is to compare the urinary excretion and blood levels following the administration of various sulphonamide compounds to children, and to relate these observations to the use of these drugs in the prophylaxis and treatment of bacillary dysentery.

Numerous papers have lately been published testifying to the value of various sulphonamides in the treatment of bacillary dysentery. It has been suggested that a drug which is only poorly absorbed from the lumen of the intestine would be more effective than one which is well absorbed, because there would be a higher concentration of the drug in the fæces. Recent work, however, makes it clear that numerous sulphonamides are effective: Masefield (1941), Reiter and Marberg (1941), Bell (1941), and Paulley (1942) used sulphapyridine; Cooper and others (1941) used sulphathiazole; Marshall and others (1941), Firor and Poth (1941), and Anderson and Cruikshank (1941) used sulphaguanidine; Smyth and others (1943) used succinylsulphathiazole (sulphasuxidine); Bulmer and Priest (1943) favoured sulphaguanidine.

In the Medical Research Council war memorandum *Medical Use of the Sulphonamides* (1943), sulphaguanidine and succinylsulphathiazole were recommended for the treatment of intestinal infections because only 25–50% of the former and about 5% of the latter were stated to be absorbed. On the other hand, Paulley (1942) found that sulphapyridine had advantages over sulphaguanidine; he drew an analogy between dysentery and tonsillitis and suggested that it is not the concentration of the drug in the intestinal contents but the concentration in the blood which is the important factor. For this hypothesis there is much to be said, especially when applied to the treatment of an established case of dysentery. If the drug is being used as a prophylactic as distinct from a curative measure, one's aim should be to get as high a concentration as possible in the intestinal contents by employing a preparation which is poorly absorbed, for the organisms are probably confined to the lumen of the intestine and are not in the mucosa.

During a recent outbreak of Sonne dysentery in a children's ward, an attempt was made to control the epidemic by giving each child a 48-hour course of either sulphaguanidine or succinylsulphathiazole. The opportunity was taken of observing the blood levels and urinary excretion of the drugs in some of the children who did not have diarrhœa. Some comparable observations have been made on patients receiving sulphathiazole for various skin conditions. Similar observations made on patients receiving sulphapyridine were rendered valueless because of the frequency of vomiting.

METHOD

The drug was administered over a period of 48 hours; dosage was calculated according to the body-weight, 0·05 g. per kg. being given 4-hourly. The blood concentration of the drug was estimated 44 hours after the treatment was begun. The urine was saved and measured for 5 days and the total amount and the concentration of drug in both the free and acetylated forms was estimated.

We have used the urinary excretion as a means of comparing the various amounts of the different drugs absorbed; but we must point out that this is not necessarily a valid assumption in view of the fact that different amounts of the various drugs may either be converted into other substances in the body or fixed in the tissues.

The estimations were made by the method of Bratton and Marshall (MRC 1943).

RESULTS

Six series of observations were made on patients receiving sulphaguanidine and sulphathiazole, and five series on patients receiving succinylsulphathiazole. From figs. 1 and 2 and the table it will be seen that the excretion of sulphaguanidine and sulphathiazole in the urine was almost identical, although there was a very great individual variation; whereas only a very small amount of succinylsulphathiazole was excreted. The excretion has been expressed as a percentage of the total dose given. The extent of the variation is well shown by case C, who was given sulphathiazole on two occasions; the first time he excreted 24·2% of the dose given and the second time 35%. In none of the children who received sulphaguanidine was more than a trace excreted on the fifth day—that is, 3 days after they ceased to receive the drug—and only very small amounts of sulphathiazole were excreted during this period.

One interesting case is the boy B, who at different times received each of the three drugs. He excreted 16% of the dose of sulphaguanidine that he was given, 18·4% of the sulphathiazole, but only 1·7% of the succinylsulphathiazole.

The blood levels of sulphathiazole were considerably higher than those of sulphaguanidine; this might have been due to slower excretion, or conversion into another compound. Of the total sulphaguanidine in the urine, 77·4% was excreted in the first 48 hours and 22·6% in the second, compared with 70·2% and 30·8% for sulphathiazole, thus indicating that the higher blood level is, at any rate in part, due to slower excretion. The blood levels obtained agree with those of other workers: a mean of 2·14 mg. per 100 ml. total and 1·56 free were obtained for sulphaguanidine and 4·7 total and 3·45 free for sulphathiazole. Hawking (1942a and b), who made observations on patients after the administration of 3 g. of either sulphaguanidine or sulphathiazole by mouth, found that the blood concentrations of free drug in mg. per 100 ml. were 1·6, 1·7 and 1·7 for sulphaguanidine, and 2·8, 3·1 and 2·2 for sulphathiazole; on the other hand, the fæcal concentrations of sulphaguanidine were consistently higher than those of sulphathiazole. Marshall (1941) found that the blood levels of sulphaguanidine 4 hours after the administration of 0·05 g. per kg. in 17 patients (54 observations) averaged 2·52 mg. per 100 ml. total and 1·91 free. However, in the dog, Ambrose and Haag (1942) found that sulphathiazole and sulphaguanidine produced approximately equal blood concentrations.

In the last two columns of the table the highest urinary concentrations which were reached in each individual case are recorded. The concentration of sulphaguanidine was as high as 227 mg. per 100 ml. total and 194 mg. per 100 ml. free in one instance; with sulphathiazole the highest values were 400 mg. per 100 ml. both total and free. Now the solubility of sulphaguanidine in urine is 220 mg. per 100 ml. at a pH of 7·1, and of sulphathiazole only 102 at a pH of 5·4, but 859 at a pH of 8·2 (MRC 1943). So with both these drugs it is important to ensure an adequate urinary output, and, at any rate in the case of sulphathiazole,

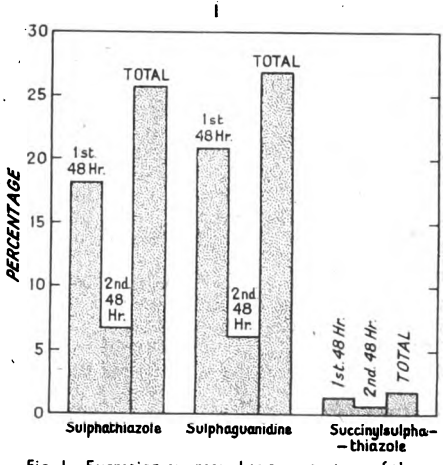

Fig. 1—Excretion expressed as a percentage of the dose given.

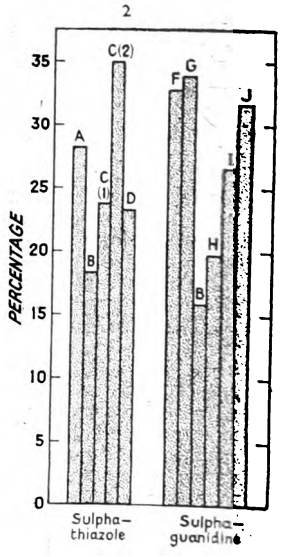

Fig. 2—Total excretion expressed as percentage of the dose given, showing individual variation in 9 patients (C received two courses of sulphachiazole).

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to keep the urine alkaline. Neither with sulphathiazole nor sulphaguanidine did the total urinary excretion in any period bear any relation to the urinary volume; thus the urinary concentration was much higher when the volume was small.

CONCLUSIONS

Approximately equal proportions of sulphathiazole and sulphaguanidine are excreted in the urine after the administration of similar doses of the drugs. Only a very small proportion of succinylsulphathiazole is excreted in the urine.

The blood levels obtained with sulphathiazole are slightly higher than those obtained with sulphaguanidine; this may be partly because sulphathiazole is excreted slightly more slowly than sulphaguanidine.

In the light of these observations one might expect succinylsulphathiazole to be of most value as a prophylactic against bacillary dysentery, but possibly not to be as effective as either sulphathiazole or sulphaguanidine in the treatment of established cases.

When using either sulphathiazole or sulphaguanidine it is important to ensure an adequate urinary output, and with sulphathiazole the urine should be kept alkaline.

BLOOD LEVELS AND URINARY EXCRETION OF SULPHONAMIDES IN CHILDREN GIVEN 0·05 G. PER KG. BODY-WEIGHT EVERY 4 HOURS

I—SULPHATHIAZOLE

Patient	Age (yr.)	Total dose (g.)	Blood level (mg./100 ml.)		% of dose given excreted in: 1st 48 hr.		2nd 48 hr.		Total % excreted*	Highest urinary conc. (mg./100 ml.)	
			T.	F.	T.	F.	T.	F.		T.	F.
A	5	12	..	2·96	19·2	16·8	9·18	1·04	28·5	400	400
B	6	12	..	..	16·8	15·9	1·55	1·52	18·4	289	266
C(1)	15	30	4·7	..	16·6	16·6	7·65	6·13	24·2	122	122
C(2)	15	30	4·7	2·9	23·2	20·8	11·7	4·29	35·0	200	170
D	8	15	6·5	5·0	13·9	10·7	..	..	..	156	95
E	11	18	2·96	2·96	19·1	17·6	3·2	2·9	23·2	311	274
Mean	..	..	4·7	3·45	18·1	16·4	6·6	3·2	25·8	..	..

II—SULPHAGUANIDINE

F	8	12·0	2·0	1·6	24·5	24·5	8·75	6·08	33	150	150
G	12	18·0	2·7	1·84	28·3	23·9	5·5	4·21	34	227	191
H	6	12·0	1·2	1·2	13·6	13·6	2·42	1·5	16	162	162
H	10	18·0	2·7	1·76	13·0	11·1	7·5	4·72	20	190	162
I	6	12·0	2·1	1·4	19·7	19·7	7·08	3·75	27	145	145
J	9	12·0	..	..	26·8	23·3	5·08	3·25	32	218	194
Mean	..	..	2·14	1·56	20·9	19·0	6·0	3·9	27	..	..

III—SUCCINYLSULPHATHIAZOLE

B	6	12	Tr.	Tr.	1·00	0·73	0·76	0·63	1·7	9	8·4
H	10	18	Tr.	Tr.	1·65	1·31	0·52	0·45	2·2	15·4	13·2
F	8	12	Tr.	Tr.	1·38	0·66	0·34	0·25	1·7	13·8	5·7
K	10	15	Tr.	Tr.	0·63	0·57	1·00	0·76	1·63	15·0	11·2
L	10	15	Tr.	Tr.	1·47	0·62	0·56	0·25	2·03	16·8	6·5
Mean	..	..	..	..	1·23	0·78	0·62	0·47	1·85	..	..

* Total amount excreted throughout the 5 days on which the urine was collected. T. = total; F. = free; Tr. = trace.

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CONFUSIONAL PSYCHOSES FOLLOWING SULPHAGUANIDINE THERAPY

J. W. CROFTON
M B CAMB, M R C P
MAJOR R A M C; MEDICAL SPECIALIST

G. DIGGLE
M B EDIN, M R C P E, D P M
CAPTAIN R A M C; GRADED PSYCHIATRIST

From a General Hospital, Middle East

CONFUSIONAL psychoses are occasionally seen in patients treated with sulphonamides.[1] Because of its low absorption from the gut, sulphaguanidine rarely has toxic effects, and three cases of mental disturbance following its use may therefore be of interest. Only one of them occurred among over 600 patients treated with sulphaguanidine in our hospital in a year; the other two were transferred to us on the development of mental symptoms.

CASE 1.—A soldier aged 32 was admitted on Oct. 23, 1943, with severe Shiga dysentery. Temperature 100° F.; pulse-rate 84; blood and mucus passed almost continuously. After 5 days, as he was still having 14–16 stools a day, sulphaguanidine 3·5 g. four-hourly was ordered. On the 5th day, after taking 87·5 g., he became confused and strange in his behaviour. Next day, though he was correctly orientated and his memory was unimpaired, he felt "changed" and "out of touch with the world." He "couldn't make out what had come over" him and was unable to concentrate. His dysentery had greatly improved and he passed only five stools on the day the mental symptoms began. He was taken off sulphaguanidine, and all symptoms quickly cleared up.

CASE 2.—An airman aged 25 was transferred on March 9, 1942, from another hospital which he had entered on Feb. 26 with Flexner dysentery. Five days after the original admission he was still passing 14 stools a day with blood and mucus, so sulphaguanidine was given. On the 6th day of treatment, when he had had 89 g., mental symptoms appeared. When seen by us he was drowsy and semi-stuporose, took no interest in the ward activities, and needed to be roused to take fluids. He was completely disorientated for time and place, and although he could give his age and date of birth correctly he could not work out what year it was. Sulphaguanidine was stopped, he was given large quantities of fluids, and in 24 hours he was sufficiently normal to be moved from a psychotic to a general ward. Two days later, however, he again became confused and was found walking about naked. He was slightly disorientated for time, though not for place, and remembered his eccentric behaviour though he was unable to account for it. This relapse coincided with a rise in temperature to 101° F. and pulse-rate to 100, but he was passing only two or three relaxed stools a day with no blood or mucus. Under psychiatric treatment once more he made a rapid recovery and in 3 days he was rational. There was no previous or family history of mental disorder.

CASE 3.—A RAF corporal aged 27 was transferred on Feb. 20, 1943, from his station sick-quarters. He had been admitted on the 17th after passing four loose motions containing blood. There was then diffuse abdominal tenderness, but no pyrexia; his pulse-rate was 68 and he was not "toxic." On Feb. 18 he passed four semi-solid stools and appeared quite fit, but on the 19th there was much mucus in the stools, with possibly a little blood, and he was given sulphaguanidine 10 g. four-hourly. Next morning at 8 he was found to be confused, disorientated and catatonic; he was blue and his pulse showed an alarming tendency to fade away. He had had 60 g. of sulphaguanidine in 24 hours. At 11.15 AM he was discovered sitting up in bed, having been incontinent of urine, looking very blue, and his pulse disappeared for a few seconds at a time. Oxygen and 2 c.cm. 'Anacortone' were administered and he was sent to hospital. On arrival at 12.20 PM on Feb. 20 he was blue, disorientated and incapable of speech; he gazed around with detached curiosity varied by an occasional inane smile. There was a tendency to perseveration; for instance, he would not open his mouth till asked several times, and an equal effort was required to persuade him to close it. A limb placed in any position was kept there indefinitely. He was, however, irritable to stimuli, drawing the limb angrily away when pricked with a pin. Blood-pressure 120/80; pulse 60 and regular; respirations irregular both in frequency and

1. Little, S. C. *J. Amer. med. Ass.* 1942, **119**, 467.

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amplitude, sometimes very shallow and slow and sometimes deeper and a little faster—a Cheyne-Stokes tendency. He was apyrexial and no other abnormality was found in the nervous or other systems so far as examination was possible. Oxygen was given and improved his colour, but some blue tinge remained, suggesting that the appearance was partly due to a sulphaguanidine derivative circulating in the blood. Fluids were given in large quantities, and sodium citrate grains 30 two-hourly, to prevent deposition of acetyl derivatives in the renal tract.

By 2.30 PM he could utter a few irrelevant words, but still displayed both affective and cognitive disorientation. He was blue, but breathing normally. At 5.15 PM he was rational but had amnesia for the preceding few weeks. His general condition had much improved and oxygen was stopped, though he was still blue. Next day he was entirely orientated; his memory had returned and he even had a vague recollection of the whole of his illness. The blueness lasted another 24 hours, after which he made a rapid recovery. There was no previous or family history of mental disorder and he had no dysenteric symptoms after admission.

It may be suggested that these confusional states were due to the original dysentery, though in all cases the dysenteric symptoms had much improved, and there was no pyrexia at the onset of the psychosis. Admittedly the temperature rose with the relapse in case 2, but the stools at that time were not significantly dysenteric and the original psychotic attack had been apyrexial. We had no facilities for estimating the sulphonamides in the blood and no definite evidence of excessive sulphaguanidine absorption can be brought in the first two cases; but in case 3 the appearance was like that of a patient receiving heavy doses of sulphanilamide. This patient's dysentery was so mild, the sulphaguanidine dosage was so large and so concentrated, and the recovery after its cessation was so immediate, that we feel the drug must have been the cause of the psychosis. It should, however, be added that though we consider the dosage excessive both on economic and therapeutic grounds, it had been employed in many other cases without untoward incident.

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TOBACCO SMOKING AND PULMONARY COMPLICATIONS AFTER OPERATION

H. J. V. MORTON, MD CAMB, D A
ANÆSTHETIST, HILLINGDON COUNTY HOSPITAL, MIDDLESEX

IT has been suggested that the heavy tobacco-smoking habit carries with it an added risk of postoperative pulmonary complications (Diez 1931, Griffiths 1934, Rappert 1935, Marshall 1939), but the ætiological importance of the *catarrhe des fumeurs* is rarely emphasised by English writers. Lyons (1932) states that in his experience bronchitis is more likely to occur in heavy smokers than in those who do not smoke, or only smoke moderately. This opinion may be shared by many surgeons and anæsthetists, but I can find no statistical proof or refutation of it.

During the three years 1939–41 a study of post-operative pulmonary complications at Hillingdon County Hospital gave me an opportunity for statistical investigation of this intriguing question.

The disease complex bronchitis-atelectasis-bronchopneumonia, the *complications précoces a début généralement bronchitiques* of the French writers, accounts for the great majority of postoperative pulmonary complications. Only the figures for these types of complications are given here and it will be noted that the general morbidity-rate shown in the tables is higher than most of those arrived at in many recent studies. The reason probably lies in the method of investigation, the restriction of the inquiry to adult abdominal operation cases, the use of ether anæsthesia throughout and the inclusion of all cases of minor complications. Cases merely showing a slight productive cough with purulent sputum for a few days after operation, or exacerbations of similar preoperative conditions, were recorded, despite often negative findings on examination of the chest or absence of constitutional disturbance.

In the conditions under discussion there is no consistent relationship between the extent of constitutional disturbance and the findings on physical examination of the lungs, though it is on the latter that a diagnosis is made. Hence complications encountered were further classified, those associated with a definite constitutional upset referable to the chest condition (as far as this could be assessed) being specially noted, irrespective of diagnosis. The figures for these cases are recorded in the column headed "Ill patients" in the following tables.

METHOD OF INVESTIGATION

It is agreed that the pulmonary complication-rate is higher after abdominal operations, particularly upper abdominal operations, than after operations on other parts of the body. A study of cases of abdominal operations on adult patients was made and a consecutive series of 1257 cases (patients over 17 years of age) obtained, the total number being made up as follows:

Appendicectomies (simple drainage of abscess or general peritonitis excluded)	354
Herniotomies (all types)	301
Operations on pelvic organs (women)	282
Mid-abdominal operations (e.g., ileotransverse colostomy)	96
Upper abdominal operations	158
Genito-urinary operations (simple suprapubic cystotomy excluded)	66

The importance and advantages of personally conducted investigations where postoperative pulmonary complications are concerned has often been stressed. Statistics merely compiled from hospital notes, often inadequately written, must surely be misleading.

In this investigation I saw and questioned most of the patients before operation; the night emergency cases I saw next day. I visited the wards daily and confirmed uneventful convalescence or noted the course of complications. On the few occasions when I was away a colleague familiar with the investigation did the rounds and kept the notes. When a case had been seen to a conclusion the data were transferred to a Cope-Chart filing card. The method of approach was by some such words as: "I have been talking to a lot of the men in the ward lately and asking them, just as a matter of interest, how much they smoke. How many fags a day do you get through?" A direct question without preamble yielded a higher proportion of non-smokers than this more casual approach. They thought they were going to be forbidden to smoke for some medical reason, and some thought it best to say they didn't smoke at all. The ward sisters, however, could always provide the real answer in doubtful cases after the patient had been in the ward for a week or two.

X-ray pictures were taken in all cases of doubtful diagnosis. By this personal method of approach "fluctuations in diagnostic standard are minimised and errors of omission more nearly eliminated" (Lindskog 1937). This remark is particularly apt in regard to pulmonary complications developing after abdominal operations, as in the cases in question. In these cases the common occurrence of varying degrees of basal hypoventilation, often asymptomatic, may tend to confuse the diagnosis (Overholt and Veal 1933, Elwyn 1922, Tondeur 1937, 1938, Briscoe 1931, Muller et al. 1929).

SOME ÆTIOLOGICAL FACTORS

The part played by the anæsthetic in the causation of postoperative pulmonary complications is a subject of controversy. Many recent writers claim that the nature of the anæsthetic agent is of relatively minor importance (Gius 1940, Muller et al. 1929, Featherstone 1925, Thomas et al. 1938, Watter 1936, Rovenstine and Taylor 1936, Brunn and Brill 1930, Mastin 1938). Many will doubtless agree with Burford (1938) that "the anæsthetic may affect the result directly through the degree of damage or excessive irritation produced in the respiratory tract, and through the degree of bodily depression produced by the anæsthetic itself." It is probable that a warm moist atmosphere as produced in closed-circuit anæsthesia is less irritating to the respiratory tract than a cold dry one (Waters 1936). Certainly the gentle and more natural breathing associated with closed-circuit anæsthesia

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must reduce postoperative fatigue of a patient's respiratory muscles. In case the use of different anæsthetic agents and the use of the carbon dioxide absorption technique might have influenced the relative morbidity-rates, the cases in this series all received a general anæsthetic (nitrous oxide and oxygen with minimal ether) and half of them were anæsthetised using the closed-circuit technique.

There is evidence that the use of nasal endotracheal catheters may increase the morbidity-rate (Dawkins 1937) though one subsequent investigation did not confirm this (Campbell and Gordon 1942). In the series here described this technique was only used in a few difficult upper abdominal cases and it is most unlikely that this has upset the validity of the relative morbidity figures.

Most writers agree that heavy premedication favours pulmonary complications. This is usually attributed to prolongation of the immediate postoperative quiescent and hypoventilation period and depression of the cough reflex by powerful hypnotics (Gius 1940, Marshall 1939, Dawkins 1936, Holman 1939).

Possibly omission of atropine may have some effect (Rappert 1935). One statistical study of this question has shown that the use of basal narcotics (bromethol, pentobarbital soluble) may double the morbidity-rate for certain groups of operations (Dawkins 1936). Despite the present popularity of basal narcosis, in all probability milder premedication of the 'Omnopon'-scopolamine type is much more generally used. Omnopon-scopolamine in normal doses sometimes causes serious respiratory depression, which atropine, as premedication, never does. It might be assumed that even the use of omnopon-scopolamine, or similar drugs, might predispose a patient to pulmonary complications. The present investigation also provided an opportunity for studying this question.

All the patients received as premedication either omnopon gr. 1/3 and scopolamine gr. 1/150 or atropine gr. 1/75. These drugs were given on alternate operating days to offset any possible variation in morbidity referable to seasonal effects, and were evenly distributed with regard to upper and lower abdominal operation cases. Table I shows the results of 1065 consecutive cases. Considering these findings it appears very unlikely that the use of two kinds of premedication would have influenced the figures for the effects of tobacco-smoking which follow. Any difference in effect cannot be taken as significant—certainly not compared with basal narcosis statistics mentioned above. One would not be influenced against using omnopon-scopolamine when its excellent effects, both from the patient's and the anæsthetist's points of view are taken into account.

TABLE I—INFLUENCE OF PREMEDICATION

(Abdominal operations, all types, both sexes; gas-oxygen and ether anæsthesia)

Pre-medication	Cases	Chest clear	Bronchitis	Broncho-pneumonia and atelectasis	Total complication rate	Ill patients
					%	
Atropine	414	315	82 (19·8)	17 (4·1)	23·9	23 (5·5)
Omnopon-scopolamine	651	457	164 (25·2)	30 (4·6)	29·8	31 (4·7)

Figures in parentheses are percentages.

INFLUENCE OF TOBACCO-SMOKING

The patients were grouped into three categories: (1) smokers; (2) light smokers; (3) non-smokers. ("Smokers" were those who took more than 10 cigarettes or ½ oz. tobacco a day.) Unfortunately for the investigator, as might be expected, non-smoking men were few, and "smokers" among the women fewer. However, table II A shows the general figures obtained.

It is clear that the effects of smoking are an ætiological factor of great importance. Not only is there great disparity among the bronchitis groups, in which some variation might be expected, but also in the more serious complication groups. Further, smoking seems definitely to increase the risk of complications causing constitutional disturbance. The more striking difference between the figures for light smokers and non-smokers among the men as compared with the similar figures for women is probably accounted for by the fact that many women coming into the "light smoker" group hardly smoked at all.

Table II B shows figures for one selected group of patients, a striking comparison, though unfortunately

TABLE II—INFLUENCE OF TOBACCO-SMOKING

A. ABDOMINAL OPERATIONS, ALL TYPES

Men over 20

Group (Sm = smokers)	Cases	Chest clear	Bronchitis	Broncho-pneumonia and atelectasis	Total complication rate	Ill patients
					%	
Smokers	300	125	159 (53)	16 (5·3)	58·3	28 (9·3)
Light sm.	180	123	50 (27·7)	7 (3·9)	31·6	6 (3·3)
Non-sm.	66	61	4 (6·0)	1 (1·5)	7·5	1 (1·5)

Women over 20

					%	
Smokers	23	9	10 (43·5)	4 (17·4)	60·9	4 (17·4)
Light sm.	62	48	13 (20·9)	1 (1·6)	22·5	3 (4·8)
Non-sm.	518	460	42 (8·1)	16 (3·1)	11·2	16 (3·1)

B. NON-STRANGULATED INGUINAL HERNIA

Men, 20–60

					%	
Smokers	118	57	61 (51·5)	..	51·5	5 (4·3)
Light sm.	70	55	15 (21·4)	..	21·4	1 (1·4)
Non-sm.	22	22	..	..	..	..

C. OPERATIONS FOR NON-STRANGULATED INGUINAL HERNIA AND APPENDICECTOMY

Men, 21–40

					%	
Smokers	106	50	54 (51·0)	2 (1·9)	52·9	9 (8·5)
Light sm.	76	63	12 (15·8)	1 (1·3)	17·1	..
Non-sm.	28	28	..	..	..	..

Men, 41 *and over*

					%	
Smokers	83	34	48 (57·9)	1 (1·2)	59·1	2 (2·4)
Light sm.	43	25	18 (42·0)	..	42·0	1 (2·3)
Non-sm.	11	10	1 (9·2)	..	9·2	..

D. ABDOMINAL OPERATIONS, ALL TYPES

Men, 21–40

					%	
Smokers	141	63	73 (52·0)	5 (3·5)	55·5	14 (10·0)
Light sm.	95	72	19 (20·0)	4 (4·2)	24·2	1 (1·0)
Non-sm.	35	34	..	1 (2·8)	2·8	1 (2·8)

Men, 41 *and over*

					%	
Smokers	159	62	86 (54·0)	11 (6·9)	60·9	14 (8·8)
Light sm.	85	51	31 (36·5)	3 (3·5)	40·0	5 (5·9)
Non-sm.	31	27	4 (12·9)	..	12·9	..

Figures in parentheses are percentages.

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the number of cases is small. It will be noted that in this particular group no cases of bronchopneumonia or atelectasis were observed, though both complications occurred among the strangulated hernia cases studied.

The postoperative pulmonary morbidity-rate tends to increase with age, though it is usual to point out in this connexion that a disproportionate number of long and formidable operations occur among the older age-groups. Table II C shows figures for male patients after the usually shorter and simpler operations of appendicectomy and for non-strangulated inguinal hernia, broadly divided into younger and older age-groups. Table II D shows figures for all types of abdominal operations in similar age-groups. Some of the figures are again unfortunately small, but the tendency clearly follows that shown in the preceding tables, despite possible influencing factors connected with age.

I have observed that habitual pipe-smoking has far less significance than cigarette-smoking; but statistical proof is lacking. It also seems that temporary abstention before operation has a beneficial effect—an important point.

It is difficult to believe that the production of muco-purulent sputum within 12–18 hours of an operation is possible in the absence of a previously infected bronchial mucous membrane (Brock 1936). It may be assumed that many smokers suffer from some degree of chronic tracheobronchitis which under normal conditions may be nearly asymptomatic. The existence of this condition is often overlooked. After laparotomy, basal hypoventilation and restriction of efficient coughing bring about stagnation of bronchial secretion, the latter often already excessive in these cases. The secretion accumulates and becomes infected and purulent and true bronchitis develops. Bronchial block and a major complication may follow; alternatively, the sputum may be coughed out as vital capacity and muscular power returns and pain diminishes and before a more serious complication has had time to develop. Where there is little or no postoperative interference with vital capacity or coughing—e.g., after most non-abdominal operations—this succession of events is probably avoided at its outset. In a consecutive series of 350 major non-abdominal operations (ENT, orthopædic and gynæcological) only one case of a pulmonary complication was observed—hypostatic pneumonia in a woman of 72 after manipulation and application of a plaster spica for fractured neck of femur.

Sex-incidence.—It is generally agreed that postoperative pulmonary complications are commoner in men than in women—three times as common, according to some authorities, for all types of operations. This is usually accounted for by man's greater dependence on diaphragmatic breathing, his normal respiration being thus more interfered with after laparotomy. Also there is a greater and longer reduction in vital capacity after upper abdominal operations in men (Beecher 1933). A greater incidence of chronic infection of the respiratory tract in men associated with outdoor work in all weathers has also been suggested (Brock 1936). The operation of herniotomy in males carries a high complication-rate and this type of operation forms a large group in any statistical series (Battle 1936). Pneumonia itself is predominantly a disease of males (Stoneburner and Finland 1941, Osler 1928). It has also been suggested that women have a higher immunity because of the hardening they undergo as the result of modern dress. (Ravdin and Kern 1926). The relative importance of the heavy smoker's chronic "bronchial catarrh" is rarely mentioned (Griffiths 1934).

Table III represents the sex-incidence for the present series. It will be noted that the total complication-rate is about three times greater in males, which is in keeping with general opinion. If however table IIA is consulted it will be seen that group for group the morbidity-rate is approximately the same for the two sexes.

It may be assumed that in the usual statistical studies the preponderance of complications in males reflects the far larger proportion of heavy smokers among male patients, which group, in either sex, carries the greatest morbidity-rate. This is further supported by Burford's (1938) figures in which the male-female incidence ratio is less than 2 : 1. In this series, however,

TABLE III—SEX-INCIDENCE

Abdominal operations, all types

(Patients over 17 years of age)

Sex	Cases	Chest clear	Bronchitis	Broncho-pneumonia and atelectasis	Total complication rate	Ill patients
					%	
Men ..	599	354	218 (36·3)	27 (4·5)	40·8	38 (6·3)
Women	658	571	66 (10·0)	21 (3·2)	13·2	24 (3·6)
Total	1257	925	284 (22·6)	48 (3·8)	26·4	62 (4·9)

patients received cyclopropane anæsthesia; and since this is relatively non-irritating to the respiratory tract, the complication-rate for the male smokers was probably reduced, thus accounting for the more nearly equal sex-incidence.

SUMMARY

The incidence of bronchitis, atelectasis and bronchopneumonia after abdominal operations and "gas-oxygen-ether" has been studied in 1257 cases in adults.

The use of omnopon-scopolamine, a mild respiratory depressant, for premedication was associated with a slight but not significant increase in pulmonary complications, as compared with the use of atropine alone, which has no depressant effect.

The combined figures for all types of abdominal operations show that the morbidity-rate for smokers taking more than 10 cigarettes or ½ oz. tobacco a day is about 6 times that for non-smokers.

Smokers are more likely to develop complications associated with serious constitutional disturbance.

The sex-incidence ratio of pulmonary complications is explained.

When abdominal operations are contemplated, it is advisable for smokers to stop or reduce their smoking as a precaution against pulmonary complications.

An investigation into the behaviour of "smokers" and non-smokers after abdominal operations and anæsthetics other than ether is being undertaken.

I wish to thank Dr. W. Arklay Steel, medical director, and members of the surgical staff of the hospital, Mr. L. Fatti, Mr. G. W. Duncan and Mr. H. G. Hanley, for allowing me to follow up their cases.

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EXTENSIVE BURNS
TREATED IN AN OPEN IRRIGATION CHAMBER

H. M. GOLDBERG, MB LOND, FRCS
ASSISTANT SURGEON, EMS

ENCLOSURE of burns in an oil-coated silk envelope prevents reinfection and facilitates irrigation with antiseptics. Until recently the method could not be applied to very large burns, but the Stannard Irrigation Company has now devised a bed converted into an irrigation chamber which serves this purpose.

Equipment.—The bed is slightly broader than the normal hospital bed and is fitted with side bars 9 inches high (see figure). The head end can be cranked up to make it slope during irrigation. An overhead beam is available for extension and there is a slot on one side to fix a stand for the irrigation jar. The mattress, made of 'Sorbo' rubber, is covered with a double layer of coated silk sheet—an outer strong one for durability and an inner thin one. The sheet folds up at the sides to be fixed to the side and end bars, and it has an outlet tube at the foot end, converting the bed into a bath-tub. The blanket cover and pillow-cases are made of coated silk and the patient wears a wide coated silk gown so that everything that may come in contact with irrigation fluid is made of that material. The gown can be modified to cover all burnt areas—e.g., with a high collar and long sleeves to cover burns of the neck and hands.

Method.—The coated silk sheet and gown are sterilised by spraying with 0·2% sodium hypochlorite before the patient is put into the bed. Preliminary irrigation of the patient is done under anæsthesia with 0·2% sodium hypochlorite to which one drachm of 15% sodium lauryl sulphate is added for every pint. (The lauryl sulphate acts as a detergent and so augments the action of the hypochlorite.) Irrigations are then carried out three times a day with 0·05% sodium hypochlorite, containing 1 drachm of 15% sodium lauryl sulphate to the pint, at a temperature of 100° F. Two nurses should be available for the irrigation, which takes about 20 minutes. The cover and pillows are taken out of the bed and the sheet is sterilised by spraying with 0·2% sodium hypochlorite. The patient is then undressed. While one nurse performs the irrigation, the other cleans and sterilises the gown, which is then reapplied. The patient is never taken out of the bed until the burns are healed or ready for skin-grafting. Bedpans and urinals are sterilised before use.

The burnt area is not permanently enclosed in an airtight bag, for the gown has to be taken off for each irrigation and then put on again. The chances of reinfection, however, are minimal, for after removal of the gown the patient lies on the coated silk sheet which is sterilised by hypochlorite. The patient feels comfortable in his gown, and pain is absent because the coated silk does not stick to the raw areas. He can move about freely and is encouraged to do exercises in bed as soon as his general condition permits. Joint stiffness and contractures are thus prevented. If irrigation with 0·05% hypochlorite is painful the strength can be reduced for a few days to 0·03%.

CASE-REPORT

An aircraftman, aged 23, was admitted to Pinder Fields Hospital, Wakefield, on July 17, 1943. He had been standing on an oil tank fixing electric cables when a high-tension wire hit the tank which exploded. He was thrown into the air and his clothes caught fire. He sustained burns of face, neck, whole of chest and abdomen, perineum, left arm and leg, both hands and half the back. They were mostly of second degree but there were areas of third degree in the precordial area ($2\frac{1}{2} \times 2$ in.), the back of the left arm (10×2 in.), the left groin (7×3 in.), the inside of the left thigh (4×6 in.) and the left calf ($6 \times 2\frac{1}{2}$ in.).

On admission he was moderately shocked; the blood-pressure was 90/50 mm. Hg and the pulse-rate 120. He was given morphine gr. $\frac{1}{4}$ and warmed, and 4 pints of plasma was given intravenously. After recovery from shock the burnt areas were cleaned with soap and saline, under general anæsthesia; 5% sulphanilamide in 'Lanette' wax was applied and covered with soft-paraffin gauze; and 5% tannic acid was applied to the face.

By July 20 the burns were obviously septic and a toxic nephritis had developed. The temperature ranged between 100° F. and 102° F. and the pulse-rate between 108 and 130. He was drowsy and incontinent and the daily urinary output was only 30 oz., despite an intake of 6 pints. The urine contained albumin, leucocytes and granular casts. The blood-urea was 53 mg. per 100 c.cm., and the urea concentration 60% of normal. The sulphonamide concentration in the blood was 1·2 mg. per 100 c.cm. and sulphapyridine 1·0 g. was given four-hourly in an effort to raise it.

On July 25 the dressings were changed and sulphonamide cream reapplied. The burns were heavily infected and a swab grew streptococci, *Staph. albus* and diphtheroids. The general condition was no better; the temperature and pulse-rate remained elevated and the low urinary output persisted. The urine showed the same abnormal constituents.

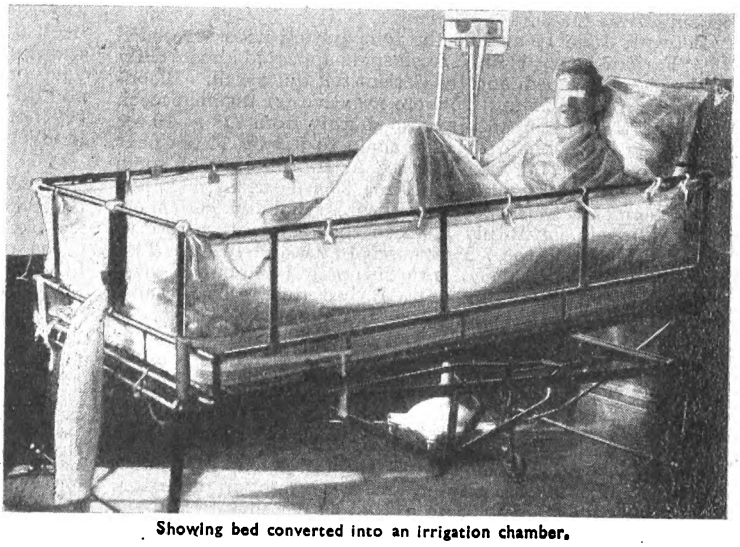
On July 29, under ethyl chloride and ether, the dressings were removed and the septic burns irrigated with 0·2% sodium hypochlorite. He was then put into the open irrigation chamber and dressed in the coated silk gown. Irrigation with 0·05% sodium hypochlorite was thenceforward carried out three times a day, and sulphonamide powder was applied in the evening, a watch being kept on blood concentration. From July 31 onwards—the second day of this treatment—the patient's attitude changed to one of cheerfulness and coöperation. Pain disappeared, apart from a slight burning sensation during irrigation. He watched with interest the spreading epithelialisation, did exercises in bed, began to read, and when the hands were healed occupied himself with embroidery. His urinary output began to improve almost immediately. On August 1 his fluid intake was 79 oz. and his output 67 oz.; on the 3rd his urine contained only a trace of albumin and no red cells or casts. The blood-urea was 40 mg. and the urea clearance 120% of normal.

By August 10 all second-degree burns had healed and lanoline was applied daily. The third-degree areas were still slightly septic. On the recommendation of Surgeon Lieut.-Commander (D) John Bunyan, we added 1 drachm of 15% sodium lauryl sulphate to every pint of 0·05% hypochlorite. On August 20 the raw surfaces were ready for skin-grafting which was undertaken. On discharge on Nov. 15, the skin everywhere was supple. There were no contractures, and movements of all joints were full.

CONCLUSION

Experience with this case suggests that the open irrigation chamber is particularly useful (1) in burns of bathing-trunk distribution, because it reduces the special risks of infection in these areas and makes nursing simple, and (2) in extensive burns which are already septic, because toxic absorption is quickly overcome.

Rather more nursing attention is required than is necessary for treatment with sulphonamide and other dressings, but no more than for the saline bath method. Rapid improvement of the general condition and the



Showing bed converted into an irrigation chamber.

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measurable daily progress of epithelialisation fully justify this additional work.

I wish to thank the Stannard Irrigation Company for their advice and their loan of all the equipment, and the medical superintendent of Pinder Fields Hospital, Wakefield, for permission to publish this report.

AN UNUSUAL CASE OF CHRONIC MENINGOCOCCAL BACTERIÆMIA

WITH A NOTE ON NOMENCLATURE

LAURENCE MARTIN, M D CAMB, M R C P
RESEARCH ASST, DEPT OF MEDICINE, CAMBRIDGE UNIV; PHYSICIAN, EMS

B. DANSIE
M B CAMB
CAPTAIN RAMC

MANY writers on chronic meningococcal blood-stream infection have remarked on its infrequent recognition despite its characteristic clinical picture. Briefly, the classical features comprise an irregular fever accompanied by crops of reddish tender spots on the limbs and body, joint pains and effusions, muscle pains and malaise. Of these the combination of fever with crops of spots is perhaps the most constant and characteristic.

The following case is recorded because the picture was unusual. The crops of spots, which appeared almost daily for six weeks, were accompanied by moderate and brief rises of temperature on three occasions only, and no other symptoms were present.

CASE-HISTORY

A soldier aged 18 first noticed crops of reddish painful spots over both shins in April, 1943. He felt perfectly well and remained on duty for about a week before being sent to a hospital on April 22. No details are available beyond a diagnosis of cellulitis of the leg, but he is certain that his temperature was not raised. He returned to his unit on the 26th, was moved to another part of this country and remained free of spots or other symptoms until May 29. The spots then recurred on the limbs and body and he reported sick only because they were painful. He felt perfectly well otherwise, no rise of temperature was observed, and he underwent strenuous training and assault courses without difficulty.

On June 17 he was admitted to an EMS hospital for investigation. He was afebrile and had no abnormal physical signs except the spots and some lesions of scabies on his wrists and fingers. Spots were present in moderate numbers on the shins, calves, thighs, chest and round the shoulder girdle. Those on the shins closely resembled erythema nodosum, but elsewhere they were about 5 mm. in diameter, reddish-purple in colour, slightly raised and painful on pressure; some had a small central hæmorrhage and somewhat resembled flea-bites. Older lesions which were fading showed as brownish or purplish stains on the skin. The spleen was not palpable and there were no muscle pains, joint pains or effusions. White blood-cells: 8800 per c.mm. with 72% polymorphs. The erythrocyte sedimentation-rate (Westergren) showed 51 mm. fall in the first hour. Radiograms of the chest and nasal sinuses were normal.

A provisional diagnosis of chronic meningococcal bacteriæmia was made.

Between June 17 and 26 the temperature never exceeded 98·4° F. (four-hourly chart); fresh spots appeared almost daily as the old ones faded, and the patient felt quite well. Blood-cultures on June 21 and 25 were negative for meningococci. On the 27th the temperature rose sharply from 97° at 10 AM to 102° at 6 PM, but had fallen again to 97° by 10 AM next day. No rigor, chill nor increase in the number of spots occurred. A blood-culture on June 28 was again negative.

The temperature then continued subnormal and fresh spots appeared again until July 5, when the temperature rose to 101° and fell again to 98·2° between 10 AM and 10 PM. Two blood-cultures were taken during this period and one of them yielded meningococci group 1. Before this result became available a third isolated rise of temperature to 99° was recorded at 6 PM on July 8 and spots appeared as before until July 10, when sulphapyridine was given in 2-gramme doses t.d.s. for three days. Thereafter, until discharge from hospital on July 28, no more spots appeared and the temperature remained subnormal. The erythrocyte sedimentation-rate, which had shown further first-hour readings of 43 and 32 mm. before administration of sulphapyridine, fell to 12 mm. three days later, and was 7 mm. on discharge. At no time did the pulse-rate exceed 80 per minute and the patient never admitted to any symptom other than the spots.

When seen again on Nov. 3 he had remained free from spots or other symptoms and had gained 1 st. in weight.

DISCUSSION

We have been unable to find recorded any similar case of chronic meningococcal blood-stream infection in which fever was such an infrequent and minor occurrence. Stott and Copeman (1940) referred to afebrile periods of varying lengths among their cases and to the danger of discharging from hospital the patients who felt well in such a phase. There can be little doubt however that their use of the term afebrile period implied also the absence of spots, for fever and spots have always been closely linked in this disease and a patient would hardly be discharged if spots were still appearing. In future it might be preferable to use the term "remission" for phases in which fever, spots and other symptoms are absent and to reserve "afebrile period" for cases such as the one described where fever was absent although spots continued to appear.

The designation of cases of chronic meningococcal blood-stream infection as a septicæmia is hallowed by long usage, but it is difficult to accept the term, with its serious implications in this particular case and in the many others whose symptoms are not severe. The term septicæmia is clearly justified in the fulminating infections by which a patient is generally overwhelmed before meningitis can develop, but the comparatively benign symptoms of the cases under discussion scarcely seem to warrant its use.

Ryle (1938) and Whitby (1940) have defined septicæmia as a grave clinical condition with high fever and severe constitutional disturbance caused by active growth of organisms in the blood-stream, while bacteriæmia, on the other hand, is a more benign state due to the simple transit of organisms in the blood as the prelude to some localised disease such as a staphylococcal perinephric abscess. In chronic meningococcal blood-stream infection the comparatively mild symptoms, together with the fact that some untreated cases ultimately develop meningitis, are far more in accord with the definition of bacteriæmia. That others have felt uneasy about using the term septicæmia is shown by Lambie (1938), who described a case of "persistent benign meningococcal bacteriæmia" and by Dock (1924), Graves et al. (1929), Marlow (1929) and Carbonell and Campbell (1938) among others who described their cases as "meningococcæmia." This latter term is perhaps the simplest description of the condition, for it is not controversial and merely signifies the presence of meningococci in the blood-stream: but its unpleasing sound would almost certainly preclude general use.

We suggest therefore that these cases be termed chronic meningococcal bacteriæmia and that the description septicæmia be abandoned. By thus using a term with milder clinical implications a better recognition of the disease may be assisted.

Finally, two important points can be noted in the case described—first that the patient underwent strenuous military training in an active phase of the disease without any symptoms other than spots which might well have been dismissed as trivial, and secondly that the disease was suspected from the characters of the spots alone. The possibility of chronic meningococcal bacteriæmia should always be borne in mind in cases resembling erythema nodosum or erythema multiforme, particularly if fever is present.

SUMMARY

A case of chronic meningococcal bacteriæmia is described in which crops of spots appeared almost daily for six weeks and were accompanied by fever on only three occasions. It is suggested that the designation of chronic meningococcal septicæmia be abandoned in favour of chronic meningococcal bacteriæmia.

Our thanks are due to the Emergency Public Health Laboratory Service, Cambridge, for blood-cultures and to Major-General A. W. Stott for a personal communication.

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Medical Societies

ASSOCIATION OF INDUSTRIAL MEDICAL OFFICERS

AT a meeting of the association on March 4, with Dr. J. C. BRIDGE in the chair, a discussion on the

Influence of Industry on Obstetrics and Gynæcology

was opened by Mr. R. A. BREWS. He began by describing menstruation as a miniature miscarriage in which the unfertilised ovum is extruded. Only about 1% of women menstruate regularly, the rest varying by several days in either direction. Mazer in America puts menstruation within the limits of normal if the loss does not last more than 7 days, and the cycle is between 21 and 35 days. Women are conditioned to expect minor mental and physical disorders in association with the menopause, but the Industrial Research Board have found that the mental and physical variations of ordinary life overshadow these. In 1933 Kaufmann published a first account of restoration of normal menstrual cycle in a woman without ovaries. He gave her 1½ million units of œstrin and 35 rabbit units of progestin and was able to establish the normal rhythm at the cost of £90 a period. This effect can now be achieved a little more cheaply but it is still an expensive luxury. It has been said that a diagnosis of primary amenorrhœa should not be made until an adolescent has reached full size and weight. Menstruation is certainly delayed in some to the age of 19 and the diagnosis should therefore only be applied to girls of 20 who have never menstruated. Of these, 70% show hypofunction of the pituitary, 15% defective ovarian function and 15% failure of development of the lower Müllerian tract. No treatment of material value is available. Those in the third group can be made to menstruate with hormone therapy, but it costs £400–500 to develop the tract in the first place and £80–90 a month to keep them going. These patients with undeveloped genital tracts, however, are well and happy and employable. Those with pituitary hypofunction are backward and lethargic, while those with defective ovarian secretion are often emotional and show other climacteric symptoms. Patients with small or infrequent menses can sometimes be made more comfortable by hormone treatment given in small replacement doses. Mr. Brews favours a trial of the hormones for a few months but thinks that in most cases the treatment is more troublesome than the condition, besides being expensive. Even the diabetic, whose life depends on treatment, often gets slack about his injections; and in menstrual disorders there is no threat to keep the patient up to the mark.

A few women do not menstruate, but ovulate regularly and are as fertile as anybody else; in these the endometrium goes through a normal cycle every month but regresses without disintegrating. Excessive menstruation, whether by excessive loss at normal intervals, or by ordinary loss at short intervals must be attributed to organic disease until organic causes have been excluded. Functional bleeding is often the outcome of hormone imbalance. The pituitary governs the reproductive cycle, and it in turn is controlled from the base of the brain by the basal ganglia and the centres of the autonomic nervous system. At puberty and the menopause disorders of hormone balance are inevitable, since the ovaries, entering or leaving the cycle, force the other endocrines to adjust themselves. There is a similar cause for menstrual irregularity after pregnancy, and function is restored with the aid of reassurance, iron and sedatives. A woman usually has anovular bleeding for the first two or three years and the last two or three years of her menstrual life, with true periods in between. The rhesus monkey has three forms of hæmorrhage from the genital tract; between April and August it bleeds every 30 days without ovulating; for the rest of the year it bleeds every 30 days and ovulates, and also bleeds slightly half way through the cycle at the time of ovulation. A very few women follow this pattern.

In the treatment of dysmenorrhœa, Mr. Brews said, there is almost no place for surgery. During the war cases of dysmenorrhœa reporting at the London Hospital have decreased but cases of abnormal menstrual function —temporary deficiency or excess—have increased. Dysmenorrhœa is largely psychogenic and better relieved by gymnastics than by hot bottles and smelling salts. Dilatation of the cervix benefits only about a quarter of the cases treated, in his experience. Patients complaining of premenstrual feelings of tension, irritation, inability to concentrate, herpes and stomatitis benefit from progestin; those who have migraine associated with the menstrual cycle often do well on œstrin. Leucorrhœa is probably due to excessive hormone activity and improves with age; it can be treated by hygienic douching in the mornings. Gonococcal infection must be suspected when the discharge is purulent but in more than half the cases there is some other cause. Films must be taken from the cervix and urethra and the posterior vaginal fornix; the blood must be taken for a gonococcal fixation test (and incidentally for Wassermann and Kahn tests). A single full test of this kind will establish the presence of the gonococcus in half the cases in which it exists; but it must be repeated three times before a negative is accepted. Many discharges are caused by *Trichomonas vaginalis*, which is easily diagnosed. The nurse who treats it should be able to use a vaginal speculum and apply the treatment to the whole vaginal canal from the cervix down. With unmarried women it may be necessary to give an anæsthetic before applying the treatment.

The low backache following childbirth is often due to subinvolution of the abdominal wall which allows the pelvis to tilt forward and puts extra strain on the sacro-iliac joint. Some women miscarry easily, and some will not miscarry however hard they try. If pregnant women are employed no doubt some will miscarry; and some of these would have miscarried if they had been at home in bed. A job in a factory is probably less exacting than that of looking after a house: a pregnant woman who is discharged may in fact be going home to greater stress.

Dr. CATHERINE SWANSTON saw no good reason why a normal pregnant woman should not work in a factory. The position is different with pathological cases. Women should be encouraged to report pregnancy to the medical department, and it should be made clear to them that pregnancy does not entail dismissal. They should be removed from toxic hazards, particularly poisons affecting the liver or blood-forming organs. After the fourth month they should not be allowed to do night work, because they are apt to do too much work in their homes if they are there during the day. Those with morning sickness can be transferred to the afternoon shift, where the three-shift system is in operation; or they can be given leave to clock in late. All pregnant women should be told to avoid heavy lifting and to keep away from ladders and overhead machinery. They should not be given work with a dermatitis risk. Transferred or unmarried women are often at a loss to know where to seek advice and the medical and welfare department can help them. No pregnant woman, she felt, should be refused her release from work if she applied for it. Recent analysis of a group of pregnant factory workers has shown that most of them work to the 5th, 6th or 7th months, the largest number being discharged during the 6th month. The unmarried women work to a later stage of pregnancy than the married, and return to work earlier after the birth of the child. Only 12% of married women return to their former jobs as compared with 25% of unmarried women—for whom, of course, there is a stronger financial motive.

Menopausal workers, Dr. Swanston finds, present a greater problem than those with menstrual irregularities. They are apt to project menopausal symptoms on to some other condition such as a works injury, and to become regular attendants at the factory surgery. The advice of a gynæcologist is often helpful in such cases. An analysis of sickness absence in a large group of women factory workers showed 5% of all sickness to be due to gynæcological causes, and among these pregnancy accounted for nearly half the time lost. Uncertified sickness was under 2% but showed that a relatively large number of women took days off from time to time, probably sometimes on account of menstrual troubles. In over 1000 women discharged for various reasons, pregnancy was the cause in 36%, and gynæcological conditions in 6%. Of the 6%, three-quarters were incapacitated by menopausal symptoms or menorrhagia. If the influence of occupation on health is to be properly

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studied, the factory doctor must be aware of the diagnosis, and the consultant and private practitioner must have a true picture of the patient's work.

Dr. JOAN MCMICHAEL spoke of the adjustments which can be made in the types of work done by pregnant women. Weight-lifting should certainly be avoided. Those with morning sickness can be given permission to come in at 8 AM instead of 7, and should be taken off the night shift. The factory medical officer can check whether they are getting their priorities in milk and eggs and whether they are attending an antenatal clinic. Dr. McMichael offers them general advice and gives them simple pamphlets on pregnancy and childbirth. If they seek advice on birth-control she refers them to their own doctor or gives the name of a clinic. Some complain of sterility, and she is able to refer these to a sterility clinic at the local hospital. She finds many of the patients are shy of approaching their own doctors if these are men. Anæmia is common, and too many of them, she considers, are satisfied with a low standard of health.

In subsequent discussion Dr. L. B. BOURNE mentioned the advantages to be expected from having an antenatal clinic inside the factory. Dr. J. B. WRATHALL ROWE posed the conundrum "If a woman is on night shift when does she have morning sickness?" but no-one offered an answer. He also asked whether calcium is to be recommended throughout pregnancy. He cautioned his colleagues about the reception sometimes given to good advice. He had suggested to a girl with bad mitral stenosis, and just about to marry, that she should get the opinion of a cardiologist before having a baby. The girl's father had complained to the management that it was no part of the factory medical officer's duty to warn her on such a matter.

Mr. BREWS said that the last three months of pregnancy are a calcium drain on the mother, and if extra calcium is to be given at all, that is the time to give it. If the mother is getting a quart of milk a day she does not need extra calcium unless the pregnancy is multiple. Answering a question, he said that 10% of women with prolapse have never been pregnant, and in 90% the condition is associated with pregnancy. The main cause is injury or loss of elasticity of the pelvic floor. After pregnancy 2 months off work with adequate exercises should be prophylactic, and after that work in industry is unlikely to do more harm than housework or standing in queues. A question from Dr. MCMICHAEL brought the answer that the calcium content of dried milk is only about 5% less than that of fresh milk.

Dr. JOSEPH ROBINSON recommended Blaud's pill for the anæmic, and Mr. BREWS endorsed this, advising doses of grains 30, three times a day. The 18 periods saved during pregnancy and lactation do not compensate for the iron lost to the fœtus and in the bleeding of labour, and the diet in this country at best is only just in iron balance.

Dr. J. E. CHEESMAN had not had the same gynæcological complaints made to him as Dr. Swanston and Dr. McMichael and wondered whether this was because he was a man. Other men at the meeting had found good nurses useful in securing the confidence of the women.

Dr. W. JEAFFRESON LLOYD thought much of the work being done was estimable but doubted whether some of it fell within the duty of industrial medical officers. Of course they get asked for advice, but he feels it is presumption to give it: they should write to the patient's doctor. Dr. ROWE disagreed. The opinion is growing, he thinks, that a doctor who works in a factory is not a doctor; but it is every doctor's duty to educate the people about their health, and that means offering advice in abnormal cases.

WEEKEND COURSE FOR FACTORY MOs.—Sir Wilson Jameson will open a course on health in the factory to be held at the London School of Hygiene, Keppel Street, W.C., on March 25 and 26, beginning at 2 PM on the Saturday. The lecturers will include: Dr. C. H. C. Toussaint (tuberculosis and the industrial worker), Dr. S. W. Fisher (industrial disease of coal-miners), Dr. H. B. Trumper (medical inspection of canteens), Dr. R. S. F. Schilling (young persons in industry), and Dr. N. Langdon Lloyd (the medical selection of factory personnel). During the last hour of the course a brains trust will answer questions submitted by members.

Reviews of Books

Clinical Parasitology

(3rd ed.) C. F. CRAIG, MD, colonel U.S. Army; E. C. FAUST, MA, PH D, professor of parasitology, Tulane. (Kimpton. Pp. 767. 45s.)

THE third edition within seven years of this popular textbook, like its forerunners, condenses Colonel Craig's *Amebiasis and Amebic Dysentery*, his previous works on malaria, his more recent *Laboratory Diagnosis of Protozoal Disease*, and Professor Faust's well-known *Human Helminthology*. As a modern presentment of tropical parasitology the book could hardly be bettered, but on diagnosis and treatment it is unequal; the treatment of blackwater fever, for instance, is omitted and there is no mention of diamidines for leishmaniasis. On the other hand their importance hardly warrants the space given to prophylaxis of many non-pathogenic organisms, or to those oddly-named and ferocious helminths which have now and then been reported in man. Under arthropods, spider poisoning, rickettsial diseases and relapsing fevers are well discussed. Flies and mosquitoes and their associated diseases—yellow, sandfly and dengue fevers—get generous attention. The list of malaria-carrying anopheles mosquitoes is welcome, and the technical appendix includes serological tests for helminthic infections. Two coloured plates of malaria parasites made from cultures by the Bass and Johns technique are disappointing and even somewhat misleading. The international code of nomenclature (for the taxonomically minded) and a complete list of published work conclude a comprehensive volume.

Textbook of Pathology

(4th ed.) J. MARTIN BEATTIE, MD EDIN, emeritus professor of bacteriology in the University of Liverpool; W. E. CARNEGIE DICKSON, MD EDIN., director of the pathological unit, West End Hospital for Nervous Diseases, London. (Heinemann. Pp. 1368. 84s.)

THE last edition of this book was published in 1926 and the task of the authors during war-time has not been easy. Many chapters such as those on the nervous system and on diseases of the blood have had to be revised and new subjects include virus diseases, disorders of the female reproductive organs, and the vitamin-deficiency diseases. The book is abreast of modern work and includes a description of the injuries caused by blast and by flying, and notes on the classification of the reticuloses. Written for students and practitioners it covers both general and special pathology; it has a section on animal parasites but excludes bacteriology. The need to think of pathology as a science of the living and the value of such methods as supravital staining and biopsy are emphasised. More space might have been given to shock and to injuries caused by heat and cold and less to the description of amyloid disease, but tradition, in pathology as elsewhere, dies hard. Illustrations are good and there are useful references for the thoughtful student.

This Milk Business

A. G. ENOCK, Chartered Mechanical Engineer. (Lewis. Pp. 292. 18s.)

Mr. Guy Enock, in his preface, regrets the lack of knowledge on the part of the milk-consumer; but his book is not written simply enough to serve the reading public. He is at his best with the technical aspects of milk control and distribution; the sections on production though good are incomplete. A strong advocate of pasteurisation, he favours the in-bottle method, which leads him to overestimate the risks of contamination; bacterial counts, after all, are far removed from infections with specific pathogenic bacteria. He is highly critical of the new "high temperature short time" pasteurisation and sees many faults in the "holder" method. When he comes to the health risks from milk he omits undulant fever, and mentions tuberculosis without giving its incidence in cows or the amount of human infection of bovine origin. The chief value of the volume, which is very well produced, is its contribution to the technical side of milk treatment and distribution.

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THE LANCET

LONDON: SATURDAY, MARCH 18, 1944

NOR ANY DROP TO DRINK

OR at all events to water the horses and wash the dairy pails, if you are not one of the 95% of people who have a piped supply. Take a map of England and pencil in the boundaries of the 1100 water undertakings and see what is left outside them; all the pastures and most of the cultivated land, employing (say) a couple of million people on whom we rely for our daily bread while we refuse them the reasonable comforts of civilisation. But hope for the waterless dawned again on Feb. 24 when Mr. SPEAKER allowed Mr. LEVY, who had "talked water" for years to an inattentive House of Commons, to block a local bill with an appeal for a national scheme which at once captured the imagination of the House; and when the Minister of Health, refreshingly new to his job, promised an early bill to deal with rural water and rural drains, and a white-paper setting out the whole position in the light of the inland water survey now almost completed. The thirsty greybeard may recall how near was Parliament to some comprehensive measure when it received in 1868 the Royal Commission's report, fully documented by FRANKLAND'S brilliant analyses. But in this matter of water the chemist and the engineer were a generation ahead of the sanitarian; and their very success in safeguarding privately owned supplies, by chemical and later bacteriological analysis, reduced water-borne disease to an extent that lulled the official conscience. (Our water policy cannot, said Mr. WILLINK winding up last month's debate, be such a disgrace when our typhoid deaths are the lowest in the world—forgetting perhaps the tragic slip of a county borough whose water-supply was left outside the jurisdiction of its public health department, and the anxious crop of minor epidemics that followed the rainless summer of 1933.) It was the late director of examinations to the Metropolitan Water Board who first applied to a public water-supply the discovery (demonstrated so well by NESFIELD in Mesopotamia during the last war) that chlorination could render almost any water safe to drink, and in the tactical successes on the water front the name of HOUSTON will always be remembered with respect. Many other water undertakings have lived up to their duty, but the multiplicity of local schemes has rendered more difficult any attempt at a national solution of the problem.

On strategy it would be imprudent, even a little impious, to try to anticipate Mr. WILLINK'S promised white-paper, but there are a few salient facts of common knowledge. The first is that there is plenty of water for all if we share out. The hills of Somerset and Wales and Cumberland have first call on the moisture-laden westerly breezes—holiday makers may regret it—but the 20 inches of annual rainfall left for East Anglia is enough for man and beast, and we have no long periods of drought. GLASSPOOLE showed that the total rainfall had not varied from the average for many years more than 37%-up in 1872 and 18%-down in 1887. The balance between what meteorologists call net precipitation and the requirements of the people may not leave much margin; competent judges believe the balance is on the right side. Mr. LEVY said we needed to utilise the supplies of water which descend from the heavens as well as those which rise up from beneath. At this moment the Thames has only a third of its usual March volume and the ground level of water has fallen ominously. But these are not two sources of water, they are separated only by time. The difference is that the water in the river reaches the sea more quickly, and with less purpose, than the water that percolates gently through the soil to replenish our wells.

Given this adequate volume of water why not distribute it, as Mr. CHORLTON would have us do, by a grid as if it were electric current? Two factors, one physical and the other economic, make this a dream. Water, unlike gas, will not run uphill—it cannot cross the Pennines by gravity, or even the modest ridges that separate the river basins; and the cost of trunk mains, and of pumping with its frictional loss, is prohibitive, at least for the present. Electricity itself would not have been gridded, owing to the cost of trunk cables, had not its intensity been upgraded a hundredfold—and water is incompressible. But all that is no reason why the consumer outside the star-fish tentacles of an existing piped supply should not have water laid on. The concentration of facilities on the urban community was a passing phase in our developing civilisation. The Minister of Health will now be thinking not whether water can be distributed everywhere, but how it is to be done. Maybe, in the "more vigorous central initiative" which he has promised, he will be ordering quite a number of sets consisting of a deep boring and an electric pump, and each village may get the attractive water-house which COSTE described in his Chadwick lecture ten years ago.[1] If so, he may count on having public opinion with him.

THE MOULD ANTIBIOTICS

AN ever-increasing profusion of micro-organisms are being found to produce substances which inhibit the growth of their fellows. Even in 1929 there were enough to form the subject of a monograph, and the application of these "antibiotics" to medicine has naturally stimulated research. The number of substances concerned has already strained the resources of conventional nomenclature and caused some confusion. The suffix *-in* permits one simple derivative to be named after the generic and another after the specific name of the organism of origin; the use of other characteristics is arbitrary. One way of avoiding confusion would be to postpone the act of naming until chemical characterisation has proceeded beyond the bald knowledge that the compound is acidic, phenolic or basic; this should also prevent the allotting of special names to products later found to be mixtures.

The problem was not so acute when the penicillia were first explored as sources of antibacterial agents, but it has grown rapidly. The name penicillin is reserved for a particular constitutent of a particular penicillium species, *P. notatum*; its claim to the title is by prior right and not by logic, for it is not a product common to the penicillia. It is distinct in nature

1. *Lancet*, 1933, ii, 1354, 1450.

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and action from penicillin-B or notatin,[1] which is produced by the same organism; from penillic acid,[2] which is a breakdown product of penicillin; and from penicillic acid,[3] which was isolated from a different species of penicillium. Patulin[4] is produced by at least four species of fungus[5]—*P. patulum*, *P. claviforme*, *Aspergillus clavatus* and *A. giganteus*—and has acquired three other names, claviformin, clavicin and clavatin.

Of these compounds, the practical value of penicillin is proven; its chemical structure has not been published but its molecule contains about fourteen carbon atoms. Penicillin-B is an enzyme with the extremely high molecular weight and other properties of a protein. It can be bacteriostatic in a concentration of 1 in 50 million, becoming bactericidal in higher concentrations, but it has not found chemotherapeutic application. It only acts in the presence of glucose; this is because its action on bacteria depends on its formation of hydrogen peroxide, a by-product of its normal enzymic activity which among common substances is confined to glucose. Penicillin-B is the only one of the five penicillium products which acts in this way, though another enzyme, which like it contains riboflavin and produces peroxide, is equally inhibitory to bacteria.[6] Penicillic acid is an effective bacteriostatic agent, not as yet applied therapeutically. Chemically, it is among the simplest of these substances: a tetronic acid, $C_8H_{10}O_4$, of known structure. The biological properties of penillic acid do not appear to have been investigated. Patulin also is a relatively simple compound, inhibiting the growth or activities of a wide range of bacteria and tissue cells.

The discovery of naturally occurring inhibitory substances such as these, or the discovery of chemotherapeutically useful compounds from such substances, shares at present the empiricism of other branches of chemotherapy. In the case of naturally occurring drugs this state of affairs can be changed only by the establishment of some connexion between the origin and action of the active substances. One suggestion linking these two aspects is that the antibiotic agents are formed in the organisms producing them *because* they are antibiotic.[7] From this point of view, the behaviour of a fungus in producing penicillin is comparable to that of a tree in producing quinine, which inhibits protozoa of the soil, as well as those causing malaria. In the case of many penicillia, isolation of the active substances is not necessary for the demonstration of their antibacterial effects—the immediate culture-filtrates are active in dilutions of 1/50 or 1/200. This shows the agents to be potentially effective under natural conditions; and it is suggestive that the fungi often produce less, weight for weight, of a highly active substance such as penicillin than of a less active one such as penicillic acid. Mankind, in spite of the native antibiotic agents of his skin, tears and blood, has found it expedient to appropriate those of other organisms. Fuller knowledge of the biological properties and functions of such products may provide characteristics for a more purposeful nomenclature.

1. Coulthard, C. A. et al. *Nature, Lond.* 1942, **150**, 634; Roberts, E. C. et al. *J. biol. Chem.* 1943, **147**, 47.
2. Duffin, W. M. and Smith, S. *Nature, Lond.* 1943, **151**, 251.
3. Oxford, A. E., Raistrick, H. and Smith, G. *Chem. & Ind.* 1942, **61**, 22, 48.
4. Raistrick, H. *Lancet*, 1943, ii, 625.
5. Florey, H. W., Jennings, M. A. and Philpot, F. J. *Nature, Lond.* 1944, **153**, 139.
6. Green, D. E. and Pauli, R. *Proc. Soc. exp. Biol. N.Y.* 1943, **54**, 148.
7. Salisbury, E. J. *Nature, Lond.* 1944, **153**, 170.

REVASCULARISATION OF THE HEART

SURGICAL treatment of myocardial ischæmia has still a long way to go before success becomes commonplace. Several surgeons studied it extensively from the experimental aspect before putting their views into practice. Their aim has been to give the heart muscle a new blood-supply by providing collateral channels through adhesions between the myocardium and some vascular tissue graft. Experiments have been based on the effect of obstructing the coronary vessels some time after a graft has been fixed to the heart. If the area of heart muscle cut off from its coronary supply remains viable in the grafted animals while controls show infarction there is evidence of the efficacy of the new blood-supply. Results have differed in different hands, but this may be because of technical variations in the graft and in the ligation of the coronary vessels. LERICHE and FONTAINE[1] in France recorded the successful case of a dog in which they used a muscle implant to replace an area of heart muscle which had been infarcted by coronary ligature. In the United States, BECK,[2] who has been indefatigable in his experiments, originally used pectoral muscle grafts. At Lambeth Hospital, O'SHAUGHNESSY[3] used omentum and lung as the grafting tissues. Injection studies in animals, and the few available autopsy specimens in man, have demonstrated that new blood-vessels undoubtedly develop in the adhesions, but that does not tell us whether the vascularisation is extensive enough, whether it is well placed, what is the direction of the blood-flow, or how permanent is the new circulation.

Accurate interpretation of results in man is not always easy. Patients with anginal symptoms may have definite standards of limitation on exertion or emotion; if these standards can be raised then presumably operation will have proved its worth. Other manifestations of coronary disease are uncertain in their future behaviour. The long period of medical treatment and rest which precedes operation will benefit most cases, and a patient may learn at this stage to be cautious in his activities. FEIL[4] has made a clinical appraisal of the Beck operation by studying 37 patients operated on between 1935 and the outbreak of war. There were 14 postoperative deaths, but great relief is claimed for 14 of the survivors. It seems, then, that the operation has distinct possibilities in carefully selected patients. BECK[5] compares coronary artery disease with epilepsy arising from arterial degeneration. In both heart and brain an area of anoxæmia produced by vascular sclerosis may lead to the formation of an irritable focus or "trigger." The firing of this trigger in the brain leads to the convulsive phenomena of epilepsy; in the heart it produces incoördinate contraction of the muscle elements—ventricular fibrillation. If this area of irritability can be given an additional oxygen supply the "explosion" may be avoided; the extra oxygenation may also save ischæmic muscle from

1. Leriche, R. and Fontaine, R. *Strasbourg-med.* 1932, **92**, 123.
2. Beck, C. S. *Ann. Surg.* 1935, **102**, 901.
3. O'Shaughnessy, L. *Lancet*, 1937, i, 185. *Brit. J. Surg.* 1936, **23**, 665.
4. Feil, H. *Ann. Surg.* 1943, **118**, 807.
5. *Ibid*, p. 788.

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degeneration and fibrosis. He uses the rather unfortunate term "blood-bath" for the provision of a new blood-supply, and points out that very little extra blood will be enough to preserve the vitality of the trigger zone. There are two ways in which this extra blood can be supplied—by a graft applied to the heart, and by increasing the communication between the coronary terminals, either by direct trauma (scratching or rubbing the pericardium) or by the irritation of foreign materials. Almost all workers have combined both methods. BECK uses muscle and fat plus scarification, and injects 0·2 gramme of powdered asbestos into the pericardium; KING[6] makes out a good case for the introduction of human bone dust into the pericardium after it has been adequately exposed. BECK now advocates excision of the 4th, 5th and 6th costal cartilages and entry into the left pleura through the rib beds. The pericardium is then opened and sutured to the precordium so as to bring the heart into contact with as much muscle, fat, and internal mammary and intercostal vessels as possible. The parietal pericardium is roughened, and asbestos injected before closing the wound. He has apparently abandoned his pectoral-muscle graft.

At its present stage cardiac surgery holds out no hope to the patient in extremis; in selecting patients for operation cases of advanced coronary disease must be firmly excluded, for even the most optimistic exponent of grafting cannot expect to renew degenerate heart muscle. The earlier that the diagnosis of coronary sclerosis is made the better will be the chance of surgical relief, but the harder will it be to convince physician and patient that surgery is justified. O'SHAUGHNESSY[7] gave as an example of a suitable case for surgery a middle-aged man who has had one attack of coronary thrombosis and has made a poor natural recovery. If pain and cardiac dysfunction remain six months after the thrombosis, a vascularising operation may be employed to supplement natural recovery. In his view patients with disease round the coronary orifices but healthy coronary trees are suitable for operation. In the case of angina of effort, the uncertain prognosis without grafting must be balanced against the operative risk. He would exclude patients over 65 and those with gross renal or cerebral arteriosclerosis. For the present, the death of O'SHAUGHNESSY and of his colleague H. E. MANSELL, and the more obvious demands of war surgery, have held up advances in this field in Britain.

HAPPY JOHN GRAUNT

> "For ordinary tabulations of diseases and injuries, the condition to be coded is the *final diagnosis of the principal disease or injury on account of which the patient sought treatment.* In the case of hospital in-patients, this means the disability for which the patient was admitted to hospital, taking into account all subsequent revisions of diagnosis, including the results of an autopsy where death occurred in hospital and this was permitted."

THUS Dr. Percy Stocks in his lucid introduction to a guidebook of 168 pages, published this week,[8] on how to set out morbidity statistics, which contains 963 short descriptive titles (and many sub-titles) of the diseases and injuries to be coded, along with strict coding rules. The code numbers are collated with those of the International List (1938) of causes of death and those of the US Public Health diagnosis code. It is no use complaining that the diagnosis of disease during life does not run on all fours with the death certificates, for Dr. Stocks points out convincingly that the familiar International List is in fact based upon the morbid condition which *started* the train of events ultimately resulting in death. Every deceased person is first a sick or injured person. The bulk of illnesses, however, do not lead to a fatal issue, and the new manual devotes much greater attention than does the International List to minor conditions such as skin diseases, and to disabling conditions such as fractures. And since the study of morbidity must take into account the occupation of the individual, the manual includes an entertaining classification of what it is we do, and how it is we live, under 959 headings —which will be profoundly interesting to the social historian of later generations. Professor Greenwood also cuts the ground from under the feet of the objector who pretends to doubt the usefulness, at this stage of our knowledge, of any attempts to compile statistics of disease by telling him he is no wiser than Horace's rustic waiting for the river to flow away. Should the logic of a Greenwood and the diligence of a Robb-Smith turn us into "coders" —as well they may, for otherwise we shall never know whether our treatment works—we may still envy John Graunt, FRS (1620–74) who started it all with only 10 code-words—thrush, convulsions, rickets, teeth and worms, abortives, chrysomes, infants, livergrown and overlaid.

6. King, E. S. J. Surgery of the Heart, London, 1941, p. 437.
7. See *Lancet*, 1939, ii, 217.
8. A Provisional Classification of Diseases and Injuries for use in compiling Morbidity Statistics. Medical Research Council, Spec. Rep. Ser. no. 248. By the Committee on Hospital Morbidity Statistics: chairman, Mr. E. Rock Carling, FRCS; secretary, Dr. A. H. T. Robb-Smith. HMSO. 3*s*.

QUESTIONNAIRE

HITHERTO the practice of British Governments has been to present their policies, cut and dried, in the form of parliamentary bills. The preliminary issue of white-papers for discussion by the public and all interested bodies is an innovation with much to commend it when the object is an agreed solution to complex problems. The medical profession has in this way been given a chance to express its opinions, in general and in detail, on the scheme for a National Health Service, and the next task is to ascertain these opinions and make sure that they are fully considered by the Ministries drafting the bill. The procedure adopted by the British Medical Association, as described in our issue of Feb. 19, is very well devised to suit present circumstances, and every doctor will wish to play his part by answering in the first place the questions addressed to him. A questionnaire from the British Institute of Public Opinion is now being sent by the BMA to all members of the profession at home and abroad, and the institute's analysis of the replies should display current opinion on a number of major issues raised by the white-paper. All parties will gain by knowing the extent of support for, or opposition to, specific proposals, and in our view the sending of this questionnaire marks a useful advance in democratic method within the profession.

We are asked to state that the last sentence of Question 1 ought to read: "Should or should not this basic proposal *of the white-paper* be accepted?" Some of the forms do not contain the words in italics.

MR. SOMERVILLE HASTINGS, FRCS, has been elected chairman of the London County Council. Mr. Hastings has been chairman of the hospitals and medical services committee of the council since it was reconstituted in 1934.

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Annotations

THE KING AMONG THE SURGEONS

THE luncheon at no. 39, Lincoln's Inn Fields on March 8 was domestic in the proper sense of intimate or "at home." The King, as the College's Visitor, sat on the president's right, the Duke of Gloucester on his left, at the long table in the renovated council room of the war-scarred College. The 2 vice-presidents and the 19 councillors (reinforced by generous donors and an ex-president or two) were not too far away from their guests, who included also Mr. S. M. Bruce, High Commissioner for Australia. But the occasion was none the less symbolic, for the Duke of Gloucester (who is, by the way, a perpetual student of one of the London medical schools) after being admitted to the fellowship agreed to carry with him a similar diploma for Sir Hugh Devine, one of the founders and a past-president of the Royal Australasian College of Surgeons, and to present it to him in Melbourne as he could not come to London for it. The mimosa on the table was to remind him of its Australian associations. The speeches (reported on another page) did not take long but the chat went on contentedly until the Royal brothers, before leaving, were invited to see what remains of the Hunterian museum and the plans for its restoration. Surgeons the world over have now no time for anything except their grim task of saving life and salvaging limb, but the Hunterian tradition which has been the inspiration of their handicraft lives on and the occasion was a recognition of that supreme fact.

TOXICITY OF SULPHAGUANIDINE

SULPHAGUANIDINE has been widely used in the treatment of infective intestinal disease, and has the reputation of being only very slightly absorbed and practically non-toxic. In actual fact it is much more freely absorbed and more toxic than is generally realised. It was first described in 1938 by Buttle and others,[1] who regarded it as "equal to sulphanilamide in activity and toxicity," and the studies of Marshall and his co-workers [2] in 1940, from which time its popularity dates, showed that the toxicity by mouth is certainly no more and probably less than that of sulphapyridine or sulphathiazole. It was reported by them as much less readily absorbed than other sulphonamides; one dose of 6 g. per kg. body-weight gave a lower blood concentration of the drug than 0·5 g. per kg. of sulphapyridine. But crystals of sulphaguanidine derivatives are found surprisingly often in the urine, in spite of the much greater solubility of its acetyl derivative than that of sulphapyridine or sulphathiazole, showing that a considerable proportion is absorbed. Cases with toxic symptoms are already on record—thus Cole[3] mentions a patient with ulcerative colitis who developed a morbilliform rash and vomiting due to the drug. In this issue Crofton and Diggle describe three cases of confusional psychosis arising from sulphaguanidine treatment of dysentery; their third case also developed cyanosis. The dosage in the last case was the enormous one of 10 g. four-hourly, and symptoms developed after 60 g. had been given; in the other two cases the doses were smaller, though the total was still large—87·5 g. in four days and 89 g. in five days. In another paper, Stainer and Stapleton compare the absorption and excretion of sulphaguanidine, sulphathiazole and succinylsulphathiazole (sulphasuxidine) in children, maintaining a uniform dosage of 0·05 g. per kg. four-hourly (a figure very close to that of the first two patients of Crofton and Diggle) for forty-eight hours. The total urinary excretions of sulphaguanidine and sulphathiazole in the first forty-eight hours were nearly equal, the mean values for six experiments being 27% of dose given for sulphaguanidine and 25·8% for sulphathiazole, but the blood levels of sulphaguanidine were only half those of sulphathiazole at a comparable time (2·14 mg. total and 1·56 mg. free drug per 100 c.cm compared with 4·7 mg. total and 3·45 mg. free). Smith [4] has recently described a series of adult dysentery patients treated with sulphaguanidine, many of whom developed toxic rashes about the ninth day; the blood sulphaguanidine level, on doses of 24 g. daily, was 10–14 mg. per 100 c.cm. Jamieson, Brodie and Stiven [5] have also shown that considerable amounts of sulphaguanidine are found in the urine of patients receiving therapeutic doses of the drug, and Whyte [6] has observed sulphonamide crystals in the urine of 18 out of 25 patients given a week's course of sulphaguanidine totalling 51 g., 14 of them having red cells as well in spite of a fluid intake of over 5 pints a day. Sulphasuxidine stands on a different plane; under the same conditions less than 2% of the drug ingested is found in the urine, and traces only in the blood. In surgical practice, with the large initial "loading dose" usually given, measurable quantities are sometimes found in the blood, although the level is always very much lower than that of the other compounds.

It is not yet possible to decide on the relative value of the various sulphonamides in the treatment of intestinal infections, and Paulley [7] has suggested that sulphapyridine has advantages over the more widely used sulphaguanidine. It is clear however that sulphaguanidine is a readily absorbed drug, and one capable of giving rise to toxic symptoms, and that adequate urinary output must be maintained to prevent the drug crystallising out. This is of particular importance since the conditions for which the drug is usually given—dysentery and dysentery-like illnesses—tend to a small output of concentrated urine unless energetic measures are taken. Sulphaguanidine is to be treated, like all other sulphonamides, as a valuable but potentially dangerous drug, and should not be exhibited in reckless dosage, as is the habit in some quarters today. Sulphasuxidine and possibly other drugs of the same type, in which an acyl-substituent group is attached to the NH_2 group of sulphathiazole, seem to be free from this danger, and to live up to their reputation of being very poorly absorbed.[8]

YANDELL HENDERSON

Professor Yandell Henderson, of Yale, whose death in California was announced last month, may be briefly described as the man who put carbon dioxide on the map as a therapeutic agent. It was already known that carbon dioxide is a normal stimulus to respiration, but to Henderson we owe the suggestion that over-breathing, such as may be caused by surgical operation or injury, may lead to failure of the circulation and death. His first paper on this topic was published in the *British Medical Journal* in 1906. This and others which followed shortly received too little attention; but Henderson, with characteristic vigour and outspokenness, pursued almost a campaign until the subject was taken up by the Medical Research Council 20 years later, and Dale and Evans (1926) found that carbon dioxide was necessary for the proper functioning of the vasomotor centre. In the meantime Henderson had caused carbon dioxide to be added to the cylinders of oxygen used for resuscitation by surgeons, rescue-workers in mines and fire-brigades. He had also demonstrated the great vari-

1. Buttle, G. A. H., Dewing, T., Foster, G. E., Gray, W. H., Smith, S. and Stephenson, D. *Biochem. J.* 1938, **32**, 1101.
2. Marshall, E. K., Bratton, A. C., White, H. J. and Litchfield, J. T. *Bull. Johns Hopk. Hosp.* 1940, **67**, 163.
3. Cole, S. L. *J. Amer. med. Ass.* 1942, **120**, 196.
4. Smith, H. G. *Brit. med. J.* Feb. 26, 1944, p. 287.
5. Jamieson, W. M., Brodie, J. and Stiven, D. *Ibid*, March 4, 1944, p. 322.
6. Whyte, J. H. S. *Ibid*, March 11, 1944, p. 373.
7. Paulley, J. W. *Lancet*, 1942, ii, 592.
8. Favourable findings in mice with succinyl sulphapyrazine and malyl sulphathiazole are reported by Callomon, F. T. and Raiziss, G. W. *J. Pharmacol.* 1943, 79, 200.

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ability of the venous pressure and made extensive studies of the output of the heart.

In his early days Henderson became associated with J. S. Haldane, to whom he owed much inspiration and to whom he dedicated his last book, *Adventures in Respiration*, which sums up his life's work. He took part, in 1911, with Haldane, Douglas and Schneider in the now famous expedition to Pike's Peak, Colorado, which did much to lay the foundations of the knowledge today so important in high-altitude flying. Thereafter he became increasingly well known as the leading authority in America on respiration. Most of his useful life was spent at Yale, where J. F. Fulton succeeded him in the chair of physiology; but he visited Britain regularly and was a frequenter of international congresses in physiology. To a host of friends he and his wife dispensed hospitality with great kindliness and good humour. His work remains, and with it happy memories of a great American.

PASSIVE MASSEUSE, ACTIVE PATIENT

SEEING their field widen, the Chartered Society of Massage and Medical Gymnastics have changed their name to the more apt "Chartered Society of Physiotherapy." Some of the older ideas about massage are in any case dying a natural death: we are realising nowadays that it is not what the masseuse does for the patient but what she makes him do for himself that forwards his recovery. The new name, however, will not be not a true index of this changed outlook unless, as Mr. R. W. Watson-Jones lately insisted in an address to members of the society,[1] the masseuse is willing to forgo rubbing and passive movements in favour of direct education of the patient in the active use of his muscles. It is perhaps unfair to blame the masseuse for too much faith in the patting and caressing of muscles when most patients and many surgeons encourage her in it. Only lately has the onus of getting well been shifted to the patient: in the past he has expected to lie back and be treated. Watson-Jones told the masseuses that there is only one indication for passive movements: a patient with a paralysed limb must have the joints moved to prevent stiffness and contractures. Those in training should be taught, he said, that there are no indications at all for passive forcing and stretching. He had lately seen slender union in forearm bones broken down by too much energy on the part of the masseuse; he had seen the onset of myositis ossificans, secondary nerve lesions, and an increase in the very stiffness for which the limb was being massaged. He finds muscle control of the joint to be more important than mobility, and would rather have 50° of controlled movement in the knee-joint than 160° with poor control and consequent insecurity and wobbling. The job of the physiotherapist is to get the patient to develop the muscles which move the joint. This skilled work needs a full anatomical training, for a poisonous dose of exercise may be as harmful as under-treatment. From the very beginning of treatment the patient must be guarded against forming bad habits. He must, for instance, be taught to walk properly in his plaster cast. Too many develop a trick of twisting the foot and lurching along with unequal step; they should be started off with short equal steps and should gradually increase the length of the stride. The "one-stick" limp must be prevented; patients should use two sticks or none at all. Then, treatment must be carried through to the point at which the patient can use the injured part to the full extent of its powers. Time and again, Watson-Jones finds, patients are discharged from hospital without anyone making certain that they can run, or go up and down stairs. All his patients who have injured themselves by jumping from a height are taught to jump once more; and he does not regard the treatment of a fractured os calcis as complete until the man can jump from a height of 12 ft.—which corresponds roughly to a parachute drop.

Another shift in treatment which he did not mention has been away from electric lights and sparks. In the last war it was usual to manipulate joints and to stimulate muscles with faradism. In the peace years the small value of these methods and their potential dangers became clearer to orthopædic surgeons, who have now largely given them up. For the completely paralysed muscle, however, as R. B. Zachary pointed out in a recent postgraduate lecture, the galvanic current is of value, because it prevents wasting of the muscle while the nerve is regenerating. The blood-supply of a muscle depends on the call of muscle exercise; if the muscles are allowed to lie idle they atrophy and may be permanently scarred.

Plenty of physical methods remain to fill the attention of the newly named society, among them those types of occupational therapy which aim at exercising given groups of weak muscles. These can only be applied successfully by someone thoroughly familiar with individual muscle attachments and action. Watson-Jones would like to see masseuses, physiotherapists, occupational therapists, physical-training instructors and medical gymnasts all taking a common basic training. Their work has much shared territory; they would find it an advantage to begin on common ground, parting later to enter the specialist field of their choice.

1. *J. Chart. Soc. Physiotherapy*, January, 1944, p. 72.

DANGERS OF TRILENE ANÆSTHESIA

THE manufacturer's warning, published in THE LANCET of Feb. 5 (p. 187), that trichlorethylene ('Trilene') should not be used with a closed circuit, is now explained. Some 15 cases of cranial-nerve palsies, and 6 deaths, have been ascribed to poisonous substances produced by the interaction of trilene and the soda lime of a carbon-dioxide absorber. Two patients, aged 40 years and 22 months, who were anæsthetised with trilene in a closed-circuit machine on one afternoon at a Lancashire hospital, died next day; the autopsies showing œdema of the lungs, congestion of the brain and well-marked fatty degeneration of the liver. So far only the evidence given at the inquest is available, but this pointed to decomposition of the trilene into toxic substances as the cause of death. Other cases have been thoroughly, though not yet completely, investigated. Humphrey and McClelland[1] report 13 cases of cranial-nerve palsies, with 2 deaths, seen at a hospital in Middlesex in four months of 1943. No trouble was encountered during the operations, but toxic effects appeared 24–48 hours later, ranging from subjective trigeminal anæsthesia to a complete picture of encephalitis. The first complaint was usually of numbness round the lips with difficulty in swallowing, and within 2–3 days the whole distribution of the fifth nerves was usually involved. Most cases developed a typical herpes febrilis around and sometimes inside the mouth on the third day, and at this time other cranial nerves were often affected, producing double vision, weakness of the face and palate, and tremor or deviation of the tongue. All the cranial nerves except the 1st, 2nd, 9th and 11th were involved in one or more patients. Postoperative vomiting was troublesome in about half the cases, some were depressed, listless or confused for 2–3 days, and a few complained of severe headache; there was no undue pyrexia. The milder cases recovered almost completely in a fortnight, but the more severe ones still showed subjective changes after five months. One patient died on her 3rd post-operative day, and another on his 16th. The autopsies showed œdema at the base of the brain, with capillary hæmorrhages and perivascular lymphocytic cuffing. Lumbar puncture, done in 9 patients in their first week,

1. Humphrey, J. H. and McClelland, M. *Brit. med. J.* March 4, 1944, p. 315.

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showed no rise of pressure and a sterile fluid. No evidence of a virus infection was obtained from animal inoculation of cerebrospinal fluid or brain tissue.

The mysterious feature of the cases was that they had received a variety of anæsthetic agents. But these had all been given with a circle-type apparatus, incorporating a soda-lime absorber and a bottle containing a gauze wick which retains a little of any drug given previously. It was possible for trilene to linger in the machine and be carried over into the soda lime when an anæsthetic was given with a closed circuit later. Trilene reacts with alkalis, especially when hot, and temperatures up to 70° C. had been recorded in the soda-lime cannister. Analysis showed that the trilene was pure, but it would react with soda lime to form dichloroacetylene; 1% of this compound given with ether, or ether and trilene, in the hospital's closed-circuit machine produced perivascular cuffing and focal necrosis in the brains of rabbits, and workers in Hunter's department for research in industrial medicine at the London Hospital[2] have demonstrated that it will kill rats in convulsions. This, then, seems the answer to the riddle. But there is one other possibility—that a latent herpes or other virus infection was lit up by the anæsthetic. C. H. Andrewes at the National Institute for Medical Research obtained transfer to rabbits by intracorneal inoculation of vesicle fluid, and found herpes antibodies in the sera of all 13 patients, though none had colds and only half could remember having herpes before. Herpes lesions were present in one of two cases of cranial-nerve palsy following trilene anæsthesia reported by Carden.[3] His cases, however, strongly supported a toxic ætiology, and he could implicate a particular brand of soda lime, which contained nine times as much caustic soda as the kind he had previously used, and also had a much greater avidity for water and a tendency to become excessively hot in use. He joins with Humphrey and McClelland and the manufacturers in emphasising the dangers of trilene anæsthesia with the present type of closed-circuit machine.

MALARIA AND MIGRATIONS

A PROTOTYPE of one of the problems to be faced after the war is reported from France,[4] and we should do well to profit by the lesson. In January, 1939, 418,000 Spanish Republican refugees crossed the eastern end of the Pyrenees and some 300,000 were interned in camps along the sea-coast of Roussillon, now the Department of Pyrénées-orientales. This area was one of the last in metropolitan France to be rid of malaria. In 1862 every type of the disease was commonly found, and although the district gradually became free from infection a recrudescence took place in 1915–17 with indigenous cases still occurring up to 1921. Many types of *Anopheles maculipennis* abound in the district, including *atroparvus* and *cambournaci*—the former being the principal British vector and both being important vectors in Holland and Spain. Many of the refugees were infected with malaria, as was shown by some 350 relapse cases developing in the camps. Warnings were apparently uttered by the medical profession, but without effect; and, though 195,000 women, children and old people were quickly sent on into the interior, 214,000 adult males remained in the area. Of these, 60,000 were in camp at Saint-Cyprien and 70,000 at Argelès, where the majority remained until well after the outbreak of the present war, with additions from other groups of interned aliens. The result was that in September, 1939, 9 cases of malaria appeared among the camp guards at Saint-Cyprien, and in October 5 cases in the small fishing village of Canet, just outside the camp at the outlet of the Etang de Canet; altogether there were some 50 cases that year in Canet and the neighbouring villages. In 1940 the disease did not make much headway, but in 1941, beginning in June and reaching a maximum in October, 128 cases were seen in Canet and 30 in Saint-Cyprien, and altogether some 300 cases were reported from the district. All were of the benign tertian type. In 1942 the outbreak diminished, and by June, 1943, no new cases had been observed though some half-dozen relapses were to be found in Canet; the epidemic had shrunk again into its first foyer outside the camp. The infection of Rumania with malignant tertian malaria, the Volga valley disaster, and on a smaller scale our own experience in the Isle of Sheppey after the last war should have been sufficient warning.

There is a good deal to be said for the views that the peculiar distribution of malaria in England and the rise and fall of incidence in endemic centres are defined and decided essentially by the importation of new cases of the disease and new strains of the parasite.[5] Fortunately human infection with malignant tertian seems to die out quickly in our climate, but there will be trouble with benign tertian if infected persons returning from aboard are not placed in hospitals outside the well-known areas which are potentially malarious. It is true that malaria does not spread here in the cold season, and that precautions such as screening can be taken; but temporary arrangements are apt to drift into permanency, and with mosquitoes, as with men, *quieta non movere* is a good precept.

METHYL ALCOHOL BLINDNESS

THE mixture of red wine and methylated spirits known as Red Biddie or Red Lizzie was at one time a popular drink among the poor of London and Glasgow, and methyl alcohol (wood alcohol or methanol) is used to fortify some drinks on the Continent and was often consumed in America in prohibition days. The characteristic visual changes of methyl alcohol poisoning have several times been recorded, and McGregor[6] now reports the ocular findings in an outbreak in Glasgow in 1942. There the spirit was sold at a public house in the city as gin, at a shilling a bottle; 18 cases of poisoning were treated at the Glasgow Western Infirmary, of which 7 died. Four eyes were examined post mortem, the chief histological finding being œdema of the retina and optic nerve head, but no changes were seen in the optic nerve itself, and the previous reports[7] of degeneration in the retinal ganglion cells were not confirmed. Of those who had been blind in the acute stage, 4 were examined a year later. All had made a good recovery, and only one of them had an absolute central defect of vision in one eye, the other eye being normal. Others had relative central scotomas with good vision. The changes seen with the ophthalmoscope in the acute stage are œdema of the nerve head and retina, with congestion of the retinal veins. This condition subsides leaving either a normal fundus or in the worst cases an optic atrophy. Traquair[8] describes the sequence of events in the visual fields as follows. The visual loss begins 2–3 days after ingestion, and complete or almost complete blindness rapidly ensues. Both eyes are almost always affected though sometimes unequally. After several days vision begins to return at the field periphery, which may later recover all round, leaving a central scotoma. In the worst cases this scotoma remains, but in mild ones it will recover leaving almost normal vision. The recovery may not be maintained and a permanent relapse may follow months or years later because of cicatricial changes in the optic nerve head. It therefore seems possible that the recovery in McGregor's cases may not be maintained.

2. Hunter, D. *Ibid*, p. 341. 3. Carden, S. *Ibid*, p. 319.
4. Sautet, J. *Pr. méd.* Nov. 6, 1943, p. 613.
5. James, S. P. *Proc. R. Soc. Med.* 1929, **23**, 11.
6. McGregor, I. S. *Brit. J. Ophthal.* December, 1943, p. 523.
7. Menne, F. R. *Arch. Path.* 1938, **26**, 79.
8. Traquair, H. M. Introduction to Clinical Perimetry, London, 1942, p. 153.

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Special Articles

THE PARACHUTE SURGICAL TEAM

C. J. LONGLAND
M B LOND, F R C S
MAJOR RAMC; SURGICAL SPECIALIST

LIPMANN KESSEL
CAPTAIN RAMC
GRADED SURGEON IN A PARACHUTE MEDICAL UNIT

A surgical sub-unit capable of providing for wound surgery in an airborne formation is a natural development of the medical services in modern warfare. The need for it arises from the overriding necessity of early and thorough surgical intervention in war wounds; and it has been almost wholly from this standpoint that the difficulties and occasional doubts have been tackled and overcome.

The many discussions and the experiences gained emphasised once more that first-aid—no matter how well carried out and elaborated—can never be a substitute for early surgery. This is of some importance because some take the view that the regimental medical officer, given a few instruments and extra help, may do an elaborate form of first-aid, "a little surgery," on essential cases. Practice shows that there is no such half-measure between expeditiously performed first-aid with minimal interference on the one hand and deliberate surgical intervention on the other. Once this principle had been established, it remained "only" (!) to work out the organisation and administrative details of the surgical team personnel and equipment.

Experience to date is limited. It has been gained by using the parachute-operation scale of equipment "on the ground" (i.e., with air-borne formations in a normal infantry rôle) and in two parachute operations. The first of the parachute operations was fortunately a relatively straightforward business and much was learnt about the equipment and the utilisation of local surgical facilities; most important, this operation established that it could be done. The second was a difficult parachute operation, when the surgical team worked fully and effectively behind enemy lines. In such an operation the normal channels of casualty evacuation do not exist, so that the most forward field surgical units will probably not make contact with the dressing station for some days. This is in fact the reason for the existence of surgical teams in an air-borne formation.

PERSONNEL AND EQUIPMENT

The surgeon has other ranks with him, of whom 5 are in the team, one is responsible for resuscitation and pre-operative attention, and 2 are chosen for their nursing ability. They are drawn from all walks of life and possess the intelligence, temperament and physical fitness required of a parachutist. But they generally have little experience of theatre work. All of them are made conversant with all phases of the work so that loss of one or two en route would not render the team ineffective. The work of these men reaches a high standard despite the time that must be given to parachute and field training, which are conducted in an atmosphere very different from that of the operating-theatre. Their technical efficiency, adaptability and capacity for improvisation is always encouraging. This little unit, with an anæsthetist attached, is responsible for the preoperative treatment and surgery of all cases passed on to them in the dressing station of which it is a part. They are also responsible for postoperative attention to grave cases, which are nursed separately.

Two factors govern the choice of equipment—it must be transportable in the normal aircraft containers and it must be possible to manhandle the entire bulk over varying country and possibly under fire. No theatre furniture other than light operating table or stretchers and trestles can be carried; the remainder must be improvised on arrival at the building previously chosen for the job. Much of the bulk of the equipment is made up of expendable items such as anæsthetics, plaster, dressings, plasma and fuel. These, except for the last two items, are put up in a standard pack designed for the requirements of 10 cases. Compressed materials are used to some extent. Sulphanilamide powder, soft-paraffin gauze and prepared swabs are sterilised and included in these expendable packs. Instruments present no problem in packing and are not damaged when the equipment is dropped. Standard simple instruments are used, their variety being ruthlessly cut down, but two excision sets are needed and additional abdominal and bone sets. Plenty of detachable knife blades are considered no luxury. Linen thread is the basic ligature material, but small quantities of atraumatic catgut and silkworm gut are included. Instrument trays, bowls and dishes take up a good deal of valuable space; a steriliser and boiled-water container are bulky, but equipment can be carried inside them and they are very useful. Water may present a serious problem so that a number of collapsible containers are carried for its storage.

The provision of heating and lighting is perhaps the most serious difficulty. Primus stoves are fairly satisfactory if several are available and time for their maintenance can be spared, and they are at present the source of heat. Adequate lighting is provided by paraffin pressure lamps and the indispensable electric headlamp.

In addition to theatre equipment, plasma and blood-transfusion apparatus is taken for the resuscitation ward, and essential ward requirements are also included. Beds and bedding are of course out of the question, but so far the local conditions for improvising them have been favourable. Feeders, bedpans and special items unlikely to be found on the spot are taken in separate packs.

Because each item has to be so carefully considered, one or two interesting sidelights have emerged. For instance, we found that about 40% of our cases required plaster-of-paris (we cannot carry as much of this as we should like to); that acriflavine tablets are the most economical and useful antiseptic for general use; and that a variety of suture materials can be replaced by a single roll of thread. Perhaps we are only learning afresh what was known by an older generation of surgeons and has been forgotten in the luxurious detail of modern surgical facilities. One of us found that out of nearly 150 cases in one session, only 11 required any anæsthetic other than 'Pentothal' alone. We have used ether, but the danger of fire in a theatre where primus stoves and oil lamps are employed has now been distressingly and effectively proved. In each team one or two orderlies quickly learn the technique of intravenous anæsthesia; when more than this is necessary we now use chloroform, much to the delight of our Scottish colleagues.

THE SICILIAN OPERATION

Outlined below are the results of a series of cases performed during a parachute operation; they are incomplete and given merely as an illustration.

A surgical team, dropped at night, found little difficulty in reaching a farm building and functioning for two days, the work being shared by two surgeons. A battle was in progress in the neighbourhood of the building, but the fire did not materially affect the running of the dressing station, where 35 cases were operated on with 2 deaths. Chest, neck, head and limb wounds of varying severity were treated. Of the 2 abdominal wounds which reached the dressing station neither could be rendered fit for operation despite transfusion and other measures. The remaining cases later reached the base hospitals in good condition.

Number of operations, 35; operating time, 21 hours.

Limb and muscle wounds, 20.	Open wounds of chest, 1.
Compound fracture of long bones, 7.	Penetrating abdominal wounds, 0.
Penetrating skull wounds, 2.	Amputations (mid-thigh), 2.
Jaw and neck, 2.	Postoperative deaths, 2.
Open wounds of joints, 1.	

Anæsthetics—pentothal only, 29; chloroform, 3; local, 3.

Four-fifths of the cases were operated on about 5 hours after wounding. The shortest interval was 1½ hours, and the longest 34 hours.

We are indebted to Colonel A. A. Eagger and Lieut.-Colonel P. R. Wheatley, for permission to publish this account of work which they have actively led and inspired. It is intended to correct the hyperbole and inaccuracy of accounts which have appeared in the lay press.

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ROYAL PRINCE AND SURGEONS

HM THE KING, as Visitor of the College, stayed to lunch on March 8 with the council of the Royal College of Surgeons of England, at their house in Lincoln's Inn Fields, after the President had admitted HRH the DUKE OF GLOUCESTER to the honorary fellowship.

Sir Alfred Webb-Johnson said:

May it please Your Majesty—As Visitor of our College you know, Sir, that we derive authority to elect honorary fellows from a special charter granted by Queen Victoria in the sixty-third year of her reign. The first name the council had the honour to inscribe on the roll was that of Edward, Prince of Wales, later King Edward VII. Soon afterwards the Marquess of Salisbury (Prime Minister), the Earl of Rosebery, and Field-Marshal Earl Roberts were also elected, together with thirty-six eminent surgeons from all parts of the world. Of these the only survivor is the Australian surgeon, Sir Alexander MacCormick, which gives us ground for confidence that the Duke and Duchess of Gloucester and Prince William are to sojourn for a time in a healthy clime.

Your Majesty's beloved father honoured us by accepting the honorary fellowship, and so did the Duke of Connaught and the Duke of Windsor. HRH the Princess Royal was the first lady honorary fellow, and the Earl of Athlone was elected in 1940. Our celebration of the centenary of the fellowship is brought to a fitting climax by the gracious acceptance of an honorary diploma by HRH the Duke of Gloucester.

The association of Your Majesty's family with our College is greatly prized and appreciated by all our fellows and members, and it will always be our endeavour to prove ourselves worthy of the constant encouragement which Your Majesty extends to us as our Visitor. You are already aware, Sir, of the grievous damage our College has suffered, and also of the way we have been cheered by the magnificent help we have received towards restoration and development. And now with Your Majesty's visit today we feel led to echo the words that Shakespeare put in the mouth of the Duke of Gloster:—

> "Now is the winter of our discontent
> Made glorious summer by this sun of York."

Your Royal Highness—We are particularly pleased, Sir, that you have visited our College before departing for Australia, for we have very close associations with the Royal Australasian College of Surgeons. Their ceremonial mace was a gift from our council, and the portrait of Lister which hangs in their hall was also a present from this country. Their college buildings were opened in 1935 by Sir Holburt Waring when he was our President. Their immediate past-president, Sir Hugh Devine, was made an honorary fellow of this College in 1939, but he has not been able to visit this country since his election. Because we know what great pleasure it would give our colleagues in Australia if you would undertake to present Sir Hugh with his diploma we venture to ask this favour of you.

In the National Library of Australia you will find the original manuscripts of Kipling's *Five Nations*, which it was my privilege to hand over to the Australian Government as a gift from Mrs. Kipling. I ask your acceptance of a copy of the first edition as a memento of this occasion. Included in the volume is *The Young Queen*, the poem which Kipling wrote to commemorate the inauguration of the Commonwealth:—

> "And the Five-starred Cross above them, for sign
> of the Nations Five."

Another poem in the volume is *Lichtenberg* with its tale of the Australian, who, when serving in South Africa, suddenly struck the scent of mimosa as he rode in from escort duty:—

> "That smell of the wattle round Lichtenberg,
> Riding in, in the rain."

All his memories of home were vividly awakened, for, as Kipling wrote:—

> "Smells are surer than sounds or sights
> To make your heart-strings crack."

It is our fervent hope that Your Royal Highness's term of office in Australia will be so happy that the smell of the wattle in years to come will always awaken delightful memories.

The Duke of Gloucester said:

I regard it as a great honour to have been enrolled today, in the presence of the King, as an honorary fellow of the College, and I thank you sincerely for the kind words in which you have just confirmed my admission. I shall carry my new title proudly with me to Australia, and I shall look forward to an early opportunity there of presenting his diploma, on behalf of your council, to Sir Hugh Devine. I see that this distinguished surgeon is called an honorary fellow too, so when we meet I shall have to remind him that *my* "honorary" really means what it says. I expect that the war-time shortage of skilled practitioners is as acute in the Commonwealth as here, but I would not like the Royal Australasian College, with which you are so closely associated, to think that their theatre of operations was being seriously reinforced by my arrival.

I must thank you too, Sir Alfred, very much for the Kipling first-edition which you have so kindly given me as a souvenir of this occasion. As it happens I have already seen the wattle, on its native heath, when I went to Australia ten years ago. I can now look forward to more than one season of its flowering, and I am sure you are right in saying that its scent will, in later life, remind me of what I know will be a very happy period spent among the friends I already have in Australia and the new friends whom I hope to make.

It only remains for me to thank you once again for the honour you have done me today. I see among you one who can little have thought, when he had me on the table some years ago, that he was operating on a future FRCS. It gives me an association with this distinguished College which I am proud to possess, and when I eventually return from the office to which His Majesty has been pleased to appoint me, I shall hope for another opportunity of meeting you all again.

GENERAL MEDICAL COUNCIL

INTERIM SESSION—FEB. 29–MARCH 3, 1944

AT the opening of a special session of the council for the hearing of disciplinary cases Dr. Myles Keogh was introduced as representative of the Apothecaries Hall of Ireland.

AID IN EVASION OF NATIONAL SERVICE

The case of David Davidson, registered as of 78, Mile End Road, London, E. 1, MRCS (1931). At the instance of the Ministry of National Service Dr. Davidson was charged with assisting two men liable to national service to evade their obligations by falsely certifying that they were suffering from epilepsy, although he had not attended nor treated them for this illness, nor made proper professional inquiries; with having conspired with other persons to the same end; with improperly procuring specialists to write letters concerning the men to the same end; and with aiding, abetting, counselling or procuring the men to produce in themselves apparent disabilities by instructing them how to simulate epilepsy for the purpose of examination by specialists.

Dr. Davidson appeared, accompanied by Mr. T. F. Davis, solicitor, of Messrs. Bulcraig and Davis. Mr. Gerald Howard, instructed by Messrs. Waterhouse & Co., solicitors to the council, presented the facts of the case. He called the two men, now serving in the Army, who said they had been introduced to the doctor respectively by men named Bloom and Aaronberg, who had instructed them in simulating epilepsy and given them pills to take. The doctor also had met them in his car in Baker Street and had given them instruction, on which they had persuaded the specialists that they were suffering from the disease. He had accompanied them to the interviews.

Dr. Davidson said in defence that he had never been a party to assisting anyone to evade national service. One of the men, described as E. F., he had seen four times in all from 1935, suffering from epileptic fits. The patient's brother and mother had asked the doctor to take him to a specialist. He had no reason to disbelieve any of the man's statements made to the specialist. He had seen the other man, G. H., first in the spring of 1940 and after three or four weeks had taken him to the

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specialist, honestly believing him to be an epileptic. He had seen him several times before he went before the board. His fees had been, to both men, 4*s.* 6*d.* for each visit and half a guinea for the consultation. When he had joined the Army he had sent all his records to salvage.

The council found all the charges concerning E. F. proved, and those concerning G. H. proved except the allegations of conspiracy and instruction in feigning symptoms. It directed the erasure of the name.

A SECOND HEARING

The case of Eric Dickens Spackman, registered as of 46, Shelley Road, Worthing, MRCS (1917), MB CAMB. (1921). Dr. Spackman was charged with committing adultery with Barbara Pepper, a married woman who was a patient of his. He had been cited as co-respondent in a cross-petition brought by the husband in answer to a petition by the wife for divorce on the ground of cruelty. Mr. Justice Langton had found him guilty of adultery and had awarded £1000 damages against him. He was summoned before the council in November, 1941, and Mr. Oswald Hempson, his solicitor, had then desired to call evidence which had not been called in the divorce court, to disprove that court's finding of adultery. The council would not hear this evidence, and ordered the erasure of Dr. Spackman's name. Dr. Spackman appealed to the High Court, alleging that the council, in shutting out the new evidence, had not made "due inquiry" within the meaning of the Medical Act, 1858, s. 29. The Divisional Court rejected his appeal, but the Court of Appeal and the House of Lords allowed it. Accordingly the council now summoned Dr. Spackman to attend a new inquiry.

Dr. Spackman was accompanied by Mr. Cecil Havers, KC, and Mr. H. C. Dickens, instructed by Messrs. Hempsons for the Medical Defence Union. Mr. Howard presented the facts to the council. He said that the Peppers had been married in 1927. Their relations had become unhappy before Dr. Spackman had come into the picture. In the spring of 1934 they had met Dr. Spackman and his wife socially. Some months later Dr. Spackman had been called in during the absence of Mrs. Pepper's regular attendant, and had succeeded him a little later on that doctor's retirement. In November, 1935, Mrs. Spackman had died, and Mrs. Pepper had visited the doctor's house daily for some time to look after the children and give other domestic help. From that time she was seen about a great deal with the doctor. She had been advised to rest regularly and from 1935 to 1939 she used to spend one day a week in bed, generally on Friday. During the shooting season Mr. Pepper used to go out shooting on Friday, and when he was out Dr. Spackman used to visit Mrs. Pepper, arriving between 2.30 and 3.30 and staying for several hours. A maid had seen the doctor sitting by or on the bed with his arms round Mrs. Pepper, and he had spent all the time of the visits in the bedroom with her. He had been heard to call her "darling," and on one occasion the door had been found locked when he was in the bedroom. Mr. Pepper had noticed that a tube of contraceptive tablets in her room contained many less tablets than he would have expected considering that sexual relations between husband and wife had practically ceased. On one occasion he found in her room a tube containing an entirely unfamiliar contraceptive preparation; she told him that the doctor had given it to her to cure local soreness. Later, he discovered that all contraceptives had disappeared from her room. The keyhole of a door had been blocked up. Friends of the Peppers had stated in court that at all social gatherings where they had seen the Peppers the doctor was invariably sitting next to her and she appeared to pay more attention to his wishes than to her husband's. On a visit to Switzerland she had kept a photograph of the doctor by her bedside. Mr. Pepper had found in her handbag a letter in her hand which she had been writing to the doctor and which began "My Darling." The first time Mr. Pepper had appealed to his wife and the doctor jointly to stop their associations was called, said Mr. Howard, the "theatre incident." In 1938 the Peppers had been invited to dine with Mr. and Mrs. S. P. B. Mais: the husband had declined but Mrs. Pepper had purported to go. The plan had been that the two couples should go on from the house in Worthing to a theatre in Brighton. Mr. Pepper received an anonymous telephone message upon which he drove to Dr. Spackman's house, arriving about 10.30, and found his wife's car there and his wife in the drawing-room with the doctor.

Counsel on both sides then read lengthy extracts from the official report of the proceedings in the divorce court, which had taken twelve days.

Mr. Havers called Dr. D. D. Mackintosh, who during the material time had been Dr. Spackman's partner. He said the partnership had continued after the proceedings and had come to a friendly dissolution. Dr. Spackman had invariably been at home between 2 and 3 o'clock for consultation by appointment. He had many times been in contact with Dr. Spackman between those hours. Dr. Spackman had always shown himself the soul of honour, both professionally and ethically. He thought it quite in accordance with usage that Dr. Spackman should have sent to salvage the records of Mrs. Pepper's case three months after she had ceased to be his patient.

Mr. Havers then read statutory declarations from several witnesses who, like Dr. Mackintosh, had not given evidence in the divorce court. A patient and his wife deposed that between 1936 and 1940 they had consulted the doctor at least 100 times on Tuesday and Friday afternoons and had found other patients waiting. Mr. Mais, the novelist and broadcaster, declared that on the occasion of the "theatre incident" Dr. Spackman and Mrs. Pepper had dined with him and his wife; the four had gone to the theatre in Brighton and had returned together to Mr. Mais's house in Worthing; Dr. Spackman could not have reached his own house before 11.15. A children's nurse who had been employed by the Spackmans confirmed that the doctor had attended afternoon surgery daily between 2 and 3 and often until 3.30. The proprieter of a riding stable at Findon, and a groom of the same village, said that in the autumn of 1938 Mrs. Pepper had attended the stable for instruction on several consecutive Friday afternoons. Mr. Leonard Shergold, head postmaster of Bath, and of Worthing during the material time, declared that from August, 1934, to January, 1939, Dr. Spackman had been medical officer to the Worthing post office and had been under contract to attend office patients at his own residence between 2 and 3 every day; the witness had often visited or telephoned to him during those hours and no patient had ever complained of his absence.

Dr. Spackman, giving evidence, confirmed that he and his wife had first met the Peppers in 1934 and the couples had soon formed the habit of playing tennis and cards, bathing and going to theatres together, and of calling each other by their christian names. He had been on very good terms with his wife, who had died suddenly after an operation. Mrs. Pepper had come and helped carry on the household with her husband's full knowledge and approval. Card parties had been held systematically at the houses of a number of friends in rotation; the players had sat in the same order and Mrs. Pepper had sat next to him because the place was near the fire; his was chosen to allow him to leave the party conveniently when he was called on the telephone. He had ridden habitually with Mrs. Pepper and they had usually returned to tea with the husband, who knew that they had been riding together. Before the theatre incident, when he and Mrs. Pepper had arrived at his house ten minutes before the husband's visit, the husband had never made the slightest suggestion that he disapproved of his wife's conduct with Dr. Spackman. On that occasion he seemed completely to have accepted the explanation he had received. Mrs. Pepper used to call her other men friends "darling" in public; the expression meant nothing. In April, 1939, Dr. Spackman had willingly agreed to see less of Mrs. Pepper. Before Mr. Pepper had filed his answer to Mrs. Pepper's petition against him, he had never suggested that Dr. Spackman had committed adultery with her, and the doctor denied ever having done so.

The council found the charge of adultery proved but did not see fit to direct the erasure of Dr. Spackman's name. The President observed that the doctor's conduct during the two years which had elapsed since the divorce proceedings had been irreproachable; nevertheless, the council's decision must not be taken as condoning a grave professional offence.

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Reconstruction

THE WHITE PAPER REVIEWED

III.—By a Suburban Practitioner

I AM a general practitioner, perhaps fairly representative of my section of the profession. I work in partnership, in a mixed private and panel practice, and I have been practising nearly 20 years. I would normally expect to continue in the same way another 20 years, at least, before maturing insurances might make it feasible for me to realise the value of my practice, and retire. Had I been asked a year or so ago to assess and describe my professional future, that would have been the whole of my story. Now I realise the prospect before me is vastly changed, and I turn to the white-paper to try to visualise the alteration as I must expect.

The first sentence of the abridged version puts the whole subject in perspective for me and shows that the basis of general practice as I have known it is soon to change: "The Government have announced that they intend to establish a National Health Service, which will provide for everyone all the medical advice, treatment and care they may require." Nevertheless on the next page comes the assurance that "the problem of creating a National Health Service is not that of destroying services that are obsolete and bad and starting afresh, but of building on foundations laid by much hard work over many years and making better what is already good." In earnest of this (so far as the general practitioner is concerned) it is recognised that "the family doctor" is, and must remain "the first line of defence." He is seen to be "impatient of regimentation" and nothing must prevent him "from exercising his professional skill in whatever way he believes to be in the best interests of his patient." Add to this the guarantee, to all people, that they may use the service or not, as they please, and that they may choose or change their doctor with the same freedom as they do now, and many of our worst fears begin to disappear.

Further reassurance comes from the plainly stated principle that "there will be no interference with the right of a doctor to go on practising where he is now." And one can do this apparently without fearing the intervention locally of any member, or official, of the local authority, for one's contract will be with a Central Medical Board "a small body . . . mainly professional" to which "all appointments . . . will be made in close consultation with the profession."

Hospitals are apparently to be coördinated and an area authority made responsible for insuring that enough beds are available both for general cases and for all special branches. Provision may be made for closer contact between family doctor and hospital; even, in one place, "general practitioner hospitals" are mentioned. Consultants will be more widely distributed, and will be available to see patients for, or with, general practitioners at hospitals, at clinics, or in the patient's own home.

Were this all, there would be little disagreement among practitioners as to the desirability of such a service. But there are other matters which are not made so clear, and over which long arguments can be expected to develop wherever doctors are met together.

HEALTH CENTRE OR SEPARATE PRACTICE?

Firstly, "the Government intend . . . that the new service shall be based on a combination of grouped practice and of separate practice side by side. They propose to place the group idea in the forefront of their plans in order that there may be a full trial on a large scale of the working of arrangements of this kind." The doctors are free to decide in which type of practice they wish to be employed. They will be allowed public and private patients whichever way they decide. But it can soon be shown that there are definite economic inducements which may persuade them to elect for group practice in health centres wherever this is practicable, in spite of the fact (unpalatable to many) that group practice will almost always be paid for by salary.

These inducements are very real, and are quite sufficient to persuade many different classes of doctors to overcome, where necessary, their former prejudices and accept salaried service.

There have, of course, always been some doctors who would have preferred never to have had to consider the calculation and collection of fees, nor even to have to compete to augment a capitation list. These, when offered service on a salaried basis with the added advantages of "first-class premises and equipment and assistance," will not hesitate in their choice.

Then, too, there is the young man (now, in his own opinion, not so young) returning after some five years' service in the Forces. He has never been in practice before, and looks hopefully for some place where he can settle down and learn how to assume the care of the now unfamiliar civilian patient. He is probably married, and may already have family responsibilities. He seeks an assured income, but is unlikely to have the capital available to buy and equip a practice. If income-tax remains at 10s. in the £, there will be no margin to allow for the repayment of borrowed capital out of income. And he can ill afford to risk the hazards of slowly building up a new practice. So he must choose instead the immediate security offered him in the salaried health-centre service.

Some will say that this picture is unduly biased, that the young men are as little eager as any to become salaried servants of the state, that civilian practice will absorb the demobilised men as it did after the last war. But no parallel can be drawn. At the end of the last war the ranks of the medical profession were very seriously depleted. This was partly because casualties among doctors were much higher than they have yet been in this war, but more importantly because in the early years no thought was taken for the future need for doctors. There was at first no official scheme for reservation of medical students and most of them joined the combatant forces, which meant that relatively few doctors qualified in the war years. So in 1919 the number of demobilised doctors was small. After this war it will certainly run into five figures.

Next, consider the Service man returning to his former practice, which through population migration and other vicissitudes of war may be hardly more than the bare bones of the practice he left three or four years ago. He has to face the laborious task of re-establishing himself, and from slow beginnings building his practice anew—unless, of course, he is willing to come into a health centre. If he chooses the latter alternative he is at once given a salary, and is compensated for his former practice—perhaps even compensated at its prewar value. This is bound seriously to bias his choice.

COMPULSION VIA COMPENSATION?

The provisions for compensation for loss of value of existing practices are so drawn up in the white-paper, that, should they receive legislative sanction, they will undoubtedly compel very many other practitioners to fall into line also, and enrol themselves, willy nilly, in the ranks of the grouped practitioners. Compensation (at a value yet to be agreed) is offered for only two categories of practice—that of the doctor who gives up separate practice and comes into the health centre, and that of the doctor who retires, or dies, and whose practice is declared redundant by the Central Medical Board, because enough doctors still remain in the area to satisfy the needs of that area. It is tacitly assumed that all other practices will still be saleable, as they are at present, when a doctor vacates them. Again, although much is said in the white-paper about the transfer of practice from the doctor's home to the health centre, no mention is made of the fall in value of the doctor's house when it is no longer needed for professional purposes. The truth is of course that the major part of most doctors' capital is tied up in the value of their houses and practices, and they have always counted on their eventual sale to younger men. Now, when the state is to offer to the young man both practice and premises without imposing on him any capital indebtedness, the older doctor will have difficulty in finding any purchaser. And if he does, it is unlikely that he will realise anything more than a fraction of their former value for his assets. So he, too, if he can, must seek economic shelter in the health centre, for by so doing he can offer his practice for sale to the best buyer—the state.

But is this really a desirable way of initiating this experimental stage of group practice? Can we not recognise at once that the introduction of any system whereby the majority of new entrants to general practice

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will be enabled to earn a satisfactory income without the need for any capital outlay, must mean that there will be drastic changes in the saleable value of every practice? That being so, ought we not to negotiate for compensation for the full value of all practices, accepting the corollary that once this has been agreed, the sale and purchase of practices should cease? Only in this way can injustice be avoided, and only so can a true experimental approach be made to the study of grouped practice.

The white-paper foresees difficulties in teamwork if doctors in a health centre remain "in financial competition for patients." Are not difficulties just as likely to arise if some doctors are conscripted to the team solely by economic pressure without having any faith in the merits of the new service they are helping to build? Is it likely that you will get a happy ship or a smooth voyage if half the crew are "pressed men"?

IN CONCLUSION

The cynic—particularly if he is not a general practitioner—may say that these "first thoughts" have tarried over-long on financial considerations, and that all too little has been said about the high principles involved. I offer no apology. I believe that the implications of the white-paper here indicated are ones that must be realised and faced. I believe that all my fellow general practitioners will be of one mind as to their crucial importance. On the other hand, I believe they do not present insuperable difficulties, nor involve withdrawal by the Government of any of the services promised to, and needed by, the people.

The general practitioner, better than any, understands where there have been deficiencies in the medical services in the past. He sees in the white-paper opportunities for the early elimination of many of these deficiencies. He will not be slow in taking full advantage of the proposed changes in medical practice, wherever they offer him and his patients better facilities. What he asks from those who will be representing the profession during the "stage of consultation and public discussion" is that they will ensure that he can do this without any unnecessary economic sanctions being placed upon him.

IV.—By a Provincial Practitioner

ALREADY I have heard the views of many colleagues on the white-paper, and most have (not unnaturally) been concerned with how it affects the profession, rather than how it affects the country's health. The latter question, however, is far the more important, and the answer, I think, is that the Government's proposals, if implemented, must bring great improvement.

For the first time poor patients will not have to assess the severity of their wives' or children's illnesses before deciding to afford a doctor; they will have the benefit of a specialist's opinion in their own homes, if such is needed; and they will not have to refuse treatment because they cannot meet the cost, or live too far from a hospital, or are too crippled to get to one. The correlation of hospitals, and the improved dental and tuberculosis services, are also of happy augury.

Nor is this all. The practitioner, too, will have numerous blessings. No longer will he have to haggle over a fee, or skimp his visits because the patient cannot afford them, or gently remind patients that they owe him a shilling for a certificate, or wait in a doorway while the lady of the house, wishing to pay at once, searches for the few shillings he charges. No more will he sell a bottle of medicine in which he has no faith, because Mrs. Smith wants it and will go next door if he tells her the truth about herself—though wait, will this really be changed under the new regime? Perhaps not, unless the Government's apparent wish for a salaried rather than a capitation basis is established; otherwise he with the smoothest manner and least honesty will still score heavily, and the great traditional unfortunate faith of the British public in a "bottle of medicine" will linger on.

Finally, the doctor will have a pension to relieve him of fear for his old age, and the buying and selling of practices will gradually disappear. That laymen view the buying of practices with horror is fairly well known, and though it may not be so bad as they imagine, one cannot help feeling that trade in ill health is wrong. From a practical point of view, far more important will be the abolition of the financial millstone which many a young doctor has had to hang round his neck before he could go into general practice. This has undoubtedly led to many abuses: more than one man has paid a large sum for a practice, being assured that valuable appointments would automatically be transferred to him, only to find that they went to some other practitioner instead; and often good men have not—even with the help of insurance companies—been able to go into a first-class practice, whereas others with capital behind them have secured positions to which their abilities have not entitled them. Usually the young practitioner has found himself with an initial debt of several thousand pounds, which he contracts to pay off during 10–15 years; his income has been fairly assured, provided his health remains good, but he has had to insure heavily against sickness, and save steadily against his retirement.

It may be argued that, since private practice will not be prohibited, many of these changes may not occur. But private practice will certainly be greatly curtailed, and is likely eventually to disappear save for the rich, —and with it most of these abuses.

In a published criticism of the white-paper it has been said, that as a profession we have already voted almost unanimously against giving up all private practice, and will resist any tendency on the Government's part to force this upon us. But surely this is absurd. The white-paper shows clearly that if patients so wish we may treat them privately. If on the other hand patients as a whole—that is, the country—decide that they prefer to be treated under the state, it is impossible for us to prevent it. We are but a part of the whole, and cannot dictate to the nation.

CRITICISMS AND SAFEGUARDS

Do I then, as a general practitioner in a provincial county town, approve whole-heartedly of the proposals? Unfortunately, no. If they become law in their present form they will bring great benefits to the country. But the administrative side, which will affect our profession so intimately, has still to be considered. It is this side of the paper one would like to examine more closely, and as one does so both the paper and the outlook grow greyer.

First, central control is to be vested absolutely in the Minister of Health, answering directly to Parliament, while peripheral control will be in the hands of local joint authorities, composed of members selected from the county and county-borough councils within the areas concerned. Both centrally and peripherally there will be bodies composed largely of medical men, but they will act solely in an advisory or consultative capacity; in other words, the profession will be absolutely under the control of laymen, gripped fast in the tentacles of bureaucracy, and deprived of every vestige of authority over its future.

I know only as much—or as little—as the average person about governmental control. On the other hand, I have seen a good deal of the workings of local authorities, and they appal me. The brilliant man seldom seeks election to these bodies, and their members are all too often mediocrities, cranks, or wealthy landowners out of touch with day-to-day events. That local influence, patronage and graft play an undue part in decisions is a common belief, and in my opinion the bulk of our profession, of whatever political creed, will wisely seek to avoid control by the butcher, the baker and the candlestick-maker, however worthy these may be.

How can it be avoided? First I think the white-paper has not adequately explained why a National Corporation would fail. My own feeling runs strongly in favour of such a system, though admittedly, and rightly, the majority of its members would have to be laymen. Secondly, if the Government remain firm in their design to place the profession under the central and local authorities, we must press with all our strength for—

(*a*) *Direct* representation (without voting powers) on the joint authorities—a possibility which the white-paper mentions and dismisses without giving reasons.

(*b*) The largest possible areas to be covered by the joint authorities, because the larger the field, the less will be the likelihood of petty jealousies and intrigues among the members of the authorities, and the greater the chance of selection of good men.

(*c*) Exclusion from the joint authorities—and if possible from any advisory position to the Minister himself—

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of all full-time medical men such as county medical officers, MOHs and members of the Minister's permanent medical staff, who might become the powers behind the throne, carrying more weight than the whole of the central and local advisory medical councils.

This last provision would do something to ensure that the profession would still be able to voice its opinion in a way likely to carry some weight, and not have its future unduly influenced by doctors who rarely see a patient from one year's end to another and are often out of touch with their colleagues. That this official group in the profession will need to be represented adequately on the central and local health services councils is obvious, but unless these councils are made the *sole* channels for expert medical advice to the governing authorities, we shall degenerate into a salaried body of professional men working in a bureaucracy, with no power and little voice to speak to our masters.

In England Now

A Running Commentary by Peripatetic Correspondents

THE author of *Sibyl*, when he was 41, showed up the evils of the industrial system of the "hungry forties" (there was no food rationing in those forties) and when at the age of 70 he came to power Disraeli set up the Sanitary Commission which led to the great Public Health Act of 1875, the *magna carta* of sanitation. This word sanitation was then young and Disraeli (like Humpty Dumpty) made it mean what he wanted. Sanitary reform had been scoffed at as a "policy of sewage" but to him it included "most of the civilising influences of humanity"—a phrase which Mr. Churchill probably had in mind when he spoke at the Savoy luncheon of Lord Beaconsfield's remarks on health and the laws of health. Disraeli thought it impossible to overrate the importance of the subject, and said as much in his famous Manchester speech of 1872: "the first consideration of a Minister should be the health of the people." It was on this occasion that Disraeli recalled an earlier scholar who contended that the second verse of Ecclesiastes in the Vulgate should have read (if the Preacher was as wise as he was witty) *Sanitas sanitatum, omnia sanitas*. Three years before his death he put through the bill forbidding the employment of children under ten. And all through his life he had insisted that local government should be personal and not dominated from the distant metropolis.

* * *

It's too damned plausible, this white-paper! "New lamps for old" and everything just as everybody wants it—patients have free choice of doctor; doctors have free choice of staying out or of coming in to the new service, of group practice, separate practice or health centre; of being paid on a salary or capitation basis. Nevertheless, there are a few snags. I wonder why, having swallowed the camel at an estimated cost of a mere £132 million a year, the Government have to strain at the gnat of the appliances—even the more expensive ones! I suppose it is a recognition of the very human trait that one is less careful and values less something for which one hasn't paid, either in cash or kind. If so, it is the only recognition; and there is a great deal to be given for which we are to pay only in the indirect way of insurance (27%), taxes (33·6%) and rates (36·4%).

No-one can deny that the general practitioner in the past has been far too much of a free-lance. An annotation in *The Lancet* of Feb. 12 quoted a remark that the existing medical units in industry are "independent, uncoördinated, unsupervised, and lacking in planned direction." If the words "in industry" are omitted, the sentence can refer to general practitioners, medical officers of health, school, infant welfare, and tuberculosis officers; and it puts the case in a nutshell. The faults and the remedy which the Government intend to apply to weld the health services into one harmonious whole are all admirably expounded in the pamphlet. But it is disheartening and disturbing to learn that the control of the great medical profession is not to be in its own hands. The Central Health Services Council is "a special professional and expert body" but its functions are purely consultative and advisory, and not executive; the Local Health Services Council similarly has no administrative or executive power, it is a "consultative body for voicing professional guidance" (p. 48). True, the Central Medical Board, a small body, mainly professional, is executive and is "responsible" for *some* of the administrative work of the service requiring a *specially* intimate link with the profession (p. 36). Oddly enough, considering its limited powers, it is to act as "employer" in the doctor's contract. But the real power is to lie in the hands of the new joint authorities, which are to be founded on the county and county-borough councils and to have no professional representation among their members. The white-paper is quite definite about this and says (p. 20) "Arguments can be adduced both for and against . . . but on balance the Government feel . . . that effective decisions on policy must lie entirely with elected representatives answerable to the people for the decisions that they take. . . ." Fair enough! And the obvious answer is for as many doctors as possible, however busy they may be, and whether they care for public work or not, to stand for the county and county-borough councils: for that is the only way the profession will have any real say in their own governance.

Let us be thankful there is no mention of rank of any kind whatever, so perhaps the clinician will not have to bow before the administrator, and we may be spared the spectacle of the seniors, as they grope their way up the progressively narrowing rungs of promotion, being so fearful of making an error that they are afraid to do anything but forestall criticism.

* * *

On Sept. 6 of last year Mr. Churchill put on record at Harvard University his belief that Basic English "was a carefully wrought plan for an international language capable of wide transactions of practical business and of interchange of ideas"—that it was in effect a system for keeping nation in better touch with nation, so that addition to knowledge made by one, and ideas that came out of it, might quickly become the common property of all. This is high approval from one whose everyday range of words is as wide as his. To what degree may profit come to medicine from the use of Basic? For general purposes Basic English has a list of 850 words; it has in addition special lists for special subjects such as general science, mathematics, verse and the Bible, but general use may not be made of them. Then there are words—"passport," for example—that are in international use and may with reason be taken into an international language.

But at present medicine has no special list. The Orthological Society has so far not had that help from medicine which is necessary before it can make a list that will give effect to its needs. So for the time being a medical man whose purpose is a paper in Basic may not rightly go outside those words which in his view will have a place on that list. One of these will have to be "parasite," but among the parasites are ready to hand certain complex words—words formed by the putting together of two Basic words—such as roundworms, whipworms, threadworms, pinworms and hookworms. These words are marks of a tendency in English itself, and that they have become parts of Basic English is a sign that in this respect Basic is on a natural line of development of English. It may be used as a half-way house to English. There are great hopes of a healthy future for it.

* * *

Most of us eat our daily bread with thankfulness that it is not rationed and keeps moist without going mouldy, but without bothering what it is made of. Probably it wouldn't be much good asking either, for information has been rationed. But now Mr. Loombe of the Ministry of Food has told us that in April we shall get at least 97½% of wheat, and about 2½ of rye, in the flour and leaves us guessing about the barley-meal and oatmeal that we think we have detected in the present loaf. My baker is pleased about the news. He likes rye-flour both as a technician and as a consumer. And my memory goes back in a flash to 1914 when we were living in Switzerland and enjoying our good rye bread—10% mark you, not the 100% *pumpernickel*—cut off overnight by Germany's decision to keep her rye for home consumption. I try to go on forgetting the potato flour of the last war that made the bread "ropy." We have been saved that, thanks to Woolton.

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Parliament

ON THE FLOOR OF THE HOUSE

MEDICUS MP

THE week opened unfortunately under the shadow of a mining dispute, and the difficulties in the coal-fields are only one group of troubles making the House restive and ruffled. Members were not satisfied with the kind of inquiry into soldiers' pay and allowances—some kind of informal discussion—which Mr. Churchill announced, and they went on questioning and cross-questioning to the extent of 4½ columns of Hansard. There was a similar ruffled reception for the Minister of Health's statement on housing which went on for 16½ columns. Mr. Willink announced that it is proposed to build 100,000 permanent houses in the first year after the war and 200,000 in the second year. The legislation is to be introduced after Easter and there will be a debate in the week these notes appear. But as no new arrangements have been made to acquire the land needed the old procedures, and presumably the old high costs, will continue. These 300,000 permanent houses and the many thousand temporary houses to be licensed for a limited period are projected in a postwar Britain whose general outlines still await the master plan.

A vivid light was thrown on the housing problem of the country during the debate on nutrition and infant mortality. The glaring facts of the high infantile mortality rate in Scotland presented in the Orr report were the king-pin around which the discussion revolved. For the five years before 1938 Scotland had an infant mortality rate of 77 against 57 for England and Wales. During the war period, as far as statistics are available, there has been an improvement in the rates for both Scotland and England and Wales, but the gap between the two seems to remain. The health of older children in both countries has also improved. Since the war food has been better in the working-class home, but housing is probably worse because of overcrowding. Housing conditions in Scotland were so bad in both town and country that the Committee on Evacuation before the war were unable to propose satisfactory arrangements for the dispersal of the population. War has not lessened these differences and despite improved food, bad housing levies a heavy toll on child health. Those who are acquainted with the overcrowded slums of some cities in England and Wales may well be appalled when they realise that in Scotland conditions are still worse. The debate showed that good feeding, even when housing conditions are adverse, can improve child health, but the difference between Scotland and England and Wales proves that housing remains an important factor. Until these basic problems are tackled vigorously any medical refinements will be of only minor effect.

The trend of debates is more and more with the post-war atmosphere. The coming debate on housing is to be followed by a two-day debate on the white-paper on the medical services. The general good feeling towards the white-paper remains, but opinion is hardening as regards practical details and on some things which are more than details. Nowhere has an authoritative estimate of the numbers of doctors needed in the post-war Britain yet been made. Nowhere has there as yet been a clear decision as to the part women are to play in postwar medicine. But the fact that the Minister of Education in the course of the committee debate accepted the principle of the employment of married women teachers heralds changes in other professions, including medicine.

FROM THE PRESS GALLERY

Nutrition and Infant Mortality

Mr. T. JOHNSTON opened this debate, on March 8, by describing how war has reformed our food policy. Distribution was now according to need. Foodstuffs were subsidised to keep the price within reach of the poorest and mothers and children received extra milk, eggs and vitamins. A survey of working-class families in industrial towns in Scotland had shown an improvement in the health value of their diets. Over a quarter of the children attending school were given a midday meal in Scotland, and in Glasgow, for example, in 1943 boys entering school were ⅝ in. taller and 1¼ lb. heavier than boys who entered school in the prewar quinquennium. He thought the increase in tuberculosis was due to deterioration in housing conditions and less, if at all, to nutrition. Turning to infant mortality Mr. Johnston said that last year's figure of 65 per 1000 births was the lowest in Scotland's annals; but the figure was still 30–40% higher than England's infant death-rate. Despite criticism that it had been unduly weighted in favour of nutritional aspects of the problem, he thought the Orr report on the subject had been competent and important. The comparative tables of infant mortality in the various countries carried down to the end of the quinquennium 1934–38 showed Scotland with an infant mortality of 77 and England and Wales with a mortality of 57. The main cause of the high mortality the report found to be infection—epidemic diarrhœa, pneumonia, &c. Adverse economic and social conditions also had a direct bearing upon an infant's chances of survival and, as was set out in the report, unemployment and overcrowding were higher in Scotland than in England and Wales. But bad housing, while contributory to infant mortality, was by no means the sole factor. Mr. Johnston had consulted the MOHs for Glasgow, Edinburgh, Dundee and Aberdeen, and they all concurred in that view. The industrial town of Falkirk had the lowest infant-mortality rate among the large burghs in Scotland. It had also the lowest rate for unemployment. That meant more family income, more money for food, clothing, comforts and attention.

Mr. Johnston drew the attention of local authorities to the fact that in January of this year the Scottish intake of welfare foods for mothers and children was still surprisingly lower than in England and Wales. They were 7% worse in cod-liver oil, 20% worse in vitamin A and D tablets, and 18% worse for orange juice. Scotland had rather more maternity hospital beds to births than England and Wales, and had more births in institutions. During the war, the number of hospital beds in Scotland had increased by 50% and they now had 2260. There was a steady increase in the use being made of ante-natal clinics.

He was concerned about the statement in the Orr report that about a quarter of the deaths in the first month of babyhood were due to infections, and he had asked the Scientific Advisory Committee to pursue as a matter of urgency an inquiry into this problem.

Summarising the other steps that were being taken in response to the Orr report Mr. Johnston said that everything possible was being done to prepare the way for a vast increase in sanitary and healthy housing accommodation; that local authorities were doing their utmost to increase the intake of vitamin products by mothers and babies, the number of qualified health visitors and househelps, and the quality and use of the clinic services and the number of maternity beds; and that the National Council for Health Education would strive to inculcate the advantages of high standards of personal hygiene and conduct.

In the debate which followed Mr. G. BUCHANAN asked that children should be given coal before anyone else. Dr. RUSSELL THOMAS, quoting figures from the Orr report, suggested that the hard core of deaths in the first year of life in England and Wales might be reduced to 36·5 per 1000 births. Dr. EDITH SUMMERSKILL alleged that the children of the lowest-paid men in the Services were suffering from malnutrition. If the country was not rich enough to feed its population the expenditure on the new medical services should be postponed so that money could be provided for children's allowances. It was paradoxical to set up a Royal Commission on the birth-rate when there was an appalling wastage of infant life. She characterised as inhuman the circular issued by the Ministry of Health stating that pregnancy "did not necessarily give rise to incapacity for work and pregnancy without incapacity for work was not sufficient to entitle a woman to sickness or disablement benefit." Pregnant women should be entitled to at least two months' rest before their confinement. Mr. H. LINSTEAD hoped that when the war was over the nutrition of the country would not again be left to haphazard chance. He would like to

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see the Ministry of Food continuing, preferably amalgamated with, and given priority over, the Ministry of Agriculture and Fisheries. After the war we must teach the ordinary citizen to translate the terms of the laboratory into the terms of the kitchen.

Miss F. HORSBRUGH said we had made progress from the high level of infant mortality of the bad old times but that was no excuse for not accelerating our pace. In England there were 3000 clinics, over 3000 health visitors and in country districts 2000 district nurses. Last year 96·5% of the mothers who gave birth to children were visited in their homes within a week. Beds in maternity homes and hospitals had been increased by 3000 and in England and Wales there was accommodation for at least half the mothers. A circular was being sent to local authorities on war-time provisions for making premature births as normal as possible and the death-rate as low as possible. Examinations of expectant mothers had been made in different parts of the country and so far they had found that the nutritional standard was not bad. It was disappointing that only half the mothers and babies in England took the fruit juice provided free or at a small charge. The service to be efficient must have the coöperation of the public. A reassuring report would shortly be issued by the British Pædiatric Association on rickets, which was one of the diseases which might be expected to increase in war-time. In attacking the problem of infant mortality, Miss Horsbrugh concluded, we must investigate the blackest spots and see what the reasons are.

QUESTION TIME

Housing

In the House of Commons on March 8 Mr. H. WILLINK, Minister of Health, made the following statement on postwar housing policy: During the first two years after the end of the war in Europe our primary task must be to meet the urgent needs of those who have no homes of their own. These could not be fully met or met with sufficient speed by building new houses of permanent construction. In addition, we shall have to undertake a substantial amount of emergency housing both by adapting existing buildings and by providing temporary accommodation of various kinds. The Minister of Works has already outlined the preparations that are being made in the sphere of temporary housing. The object of this statement is to indicate the lines on which the Government propose to proceed, simultaneously, with the construction of new houses of a permanent type. Both types, the permanent and the temporary, are complementary parts of a single Government policy for providing the largest possible number of new homes during these first two years. To enable local authorities to make an early start, as soon as conditions permit, with the construction of new houses of a permanent type, the Government have decided to introduce temporary legislation extending the present scope of housing subsidies so as to include dwellings built to meet general needs. Local authorities will be enabled to buy in advance land required for these housing operations, using compulsory powers if necessary. And Parliament will be asked to empower the responsible ministers, as after the last war, to confirm compulsory purchase orders for the acquisition of land for housing purposes without holding an inquiry. We hope to be able to introduce the necessary legislation shortly after the Easter recess. Meanwhile I am today inviting representatives of the associations of local authorities and of the London County Council to meet me at an early date to discuss the arrangements for housing subsidies. The local authorities will be invited to proceed on the basis that all preliminary preparations should be made to ensure that, if building resources should permit, 100,000 houses can be completed or under construction by the close of the first year after the end of hostilities in Europe and a further 200,000 by the close of the second year. These 300,000 houses will be in addition to those built under the programme of temporary construction.

Scottish Nurses' Salaries

In answer to a question the Secretary of State for Scotland announced that in a third report the Scottish Nurses' Salaries Committee have made recommendations regarding the salaries of assistant nurses, nurses in mental hospitals above the grade of charge nurse, nurses in public-assistance institutions and convalescent homes, and a few other classes of nurses. The committee have now completed their review of the salaries and conditions of the nursing profession in Scotland, with the exception of superannuation, which will be the subject of a separate report. A further review of the salaries and conditions of nurses, up to the charge-nurses grade, employed in mental hospitals and institutions has been begun.

Ministry of Health Annual Report

Mr. W. THORNE asked the Minister of Health when the annual report of the Ministry of Health for 1943 would be published.—Mr. WILLINK: I propose to issue a summary report for the year ending March 31, 1944, but I am unable at present to indicate the date of publication.

Medical Man Power

Dr. RUSSELL THOMAS asked the Minister the number of doctors who were now serving in the armed forces of the Crown and in full-time employment in the Civil Defence services and any other service created during the national emergency.—Mr. WILLINK replied: It would not be in the national interest to state the number of doctors serving in the Forces. The number employed full-time in the Civil Defence services, the Emergency Medical Service and in other services created during the present war is about 1100.

Dr. THOMAS: In view of the fact that this figure is already known, that there are 30,000 doctors in all the Services who will be seeking work when the war is over; and in view, too, of the fact that the Minister suggests giving financial help to train more, is it his intention to have at call an army of potential cheap medical labour which will be economically forced to work a National Health Service whether it likes it or not?—Mr. WILLINK: This matter is to be debated at an early date.

Medical Co-education

Sir ERNEST GRAHAM-LITTLE asked the Minister whether he was aware that the senate of London University desired to extend facilities in its medical schools for women students, but that one of the principal obstacles thereto was the inadequacy of the accommodation for men and women in this university's medical schools, which now trained nearly half the doctors of this country; and whether he would give particular attention in framing his future estimates to this position.—Mr. WILLINK replied: I am aware of the resolution on the subject of the training of women medical students recently passed by the senate of London University, and I understand that a copy of it is being sent to the Committee on Medical Schools under the chairmanship of Sir William Goodenough. The assistance likely to be needed by medical schools in the future is one of the questions under review by that committee.

Mental Treatment for Service Personnel

Sir WALTER SMILES asked the Minister of Pensions if he would reintroduce the scheme which operated during the last war under which service personnel discharged from the forces on ground of mental disorder remained the charge of the Ministry of Pensions.—Mr. B. V. KIRBY asked whether the Minister had considered a letter from the Lancashire mental hospital board, dated Feb. 29, 1944, setting out their views in regard to ex-members of HM Forces suffering from mental illness who were being treated in rate-aided public mental hospitals as distinct from treatment under the service patient scheme; and what was the nature of his reply.—Sir WALTER WOMERSLEY replied: My department already accepts liability in all cases in which the mental condition is due to service. In other cases I am not satisfied that there is good reason for making any exception to the accepted principles of entitlement or to the general social service provision for mental disorders. I have, however, agreed to receive a deputation on this subject.

Bananas for Cœliac Disease

As bananas form a useful addition to the diet of children suffering from cœliac disease, arrangements are being made which the Minister hopes will result in enough bananas being imported in dried form to provide all approved cases of cœliac disease with the supplies they need. (Mr. W. MABANE replying to Mr. R. PURBRICK.)

PECKHAM HEALTH CENTRE.—On Wednesday, March 22, at 6.45 PM, under the auspices of the Science (Research) Society, Dr. Innes Pearse is giving a public lecture on the Peckham experiment. The meeting will take place at the Alliance Hall, Palmer Street, Westminster, S.W.1.

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Letters to the Editor

THE SEPTIC HAND

SIR,—The regime of treatment for the septic hand described by Egerton and Bowen in their letter of Feb. 26 appears to be a dangerous oversimplification of the problems involved. No-one will deny that energetic conservative treatment will often produce resolution in early cases, no matter whether the infection be staphylococcal or streptococcal in origin. It is also true that such treatment is often sadly neglected, but for those cases which fail to respond to conservative measures the advice they give can only be deplored. The "superficial nicks without anæsthesia" which they recommend are still far too often to be seen gracing some of the worst cases of pulp-space infection, with necrosis of the terminal phalanx and incipient tenosynovitis; complications which would have been prevented by a timely and adequate incision. Early incision of a streptococcal infection would probably be equally calamitous, but this fact only emphasises the important truth that in sepsis of the hand which does not rapidly and completely respond to conservative treatment we are faced with a major surgical (and economic) problem which will only be solved by treatment based on a sound knowledge of the pathological processes involved. Such treatment is worthy at least of specialist supervision; demands a fully equipped theatre for its proper performance; and can never be simplified to the extent suggested.

Leatherhead, Surrey. R. C. F. CATTERALL.

COMPLICATIONS OF TRILENE ANÆSTHESIA

SIR,—All anæsthetists are grateful, I am sure, for Dr. Hunter's comprehensive article in your issue of March 4. There was one point on which he might have enlarged with advantage, for although he stressed the "rapid panting breathing . . . familiar to all anæsthetists," he did not mention how this complication could be avoided. Dr. Langton Hewer told us at the RSM on May 7 of last year that this type of breathing can usually be obviated if the 'Trilene' is not "pushed." It appears that the precipitating factor is a high partial pressure in the alveoli and blood-stream rather than depth of anæsthesia per se. Induction with trilene tends to be so tardy that the anæsthetist is apt to push the induction: *herein lies the pitfall that precipitates his patient into tachypnœa.* It is my own experience also that this complication must be detected at its inception and immediately remedied either by withdrawal of the agent responsible or by changing over to another agent. Once rapid respirations are established such measures are of little avail as the breathing remains hastened even in the presence of another anæsthetic. Trilene appears to have a "trigger" action in this respect.

Cardiac irregularities are rare if anæsthesia with trilene is limited to the lightest surgical plane (stage 3, plane 1: Guedel). In this plane also only minimal quantities of the drug are required for maintenance and I therefore feel that trilene will settle down to being used only for operations that will permit of this type of anæsthesia. If it is employed as an adjuvant to nitrous oxide still less will be required and a cautious and patient induction should then leave everyone happy.

King's College Hospital. A. H. GALLEY.

OXYGEN THERAPY

SIR,—In my hands the BLB type of mask has provided more effective oxygen therapy than the oxygen tent or nasal catheter. The "holed" mask described by Card, Griffiths and McSwiney in the *Lancet* of Feb. 5 (p. 177) has been used in the chest unit at this hospital for the past two years, and offers certain advantages over the original BLB mask for routine use. Elimination of the expiratory valve has made the apparatus not only cheaper, lighter and therefore more comfortable (being well tolerated by even small children) but also far simpler to clean and maintain in efficient working order—two most important points. Although the holed mask does not provide as high an oxygen tension as can be obtained with the original BLB mask, the increase has been found adequate for the great majority of patients. The resistance to respiration observed after prolonged use of the sponge-rubber disc type of BLB mask is not evident with the holed mask. When a patient is a *persistent* mouth-breather, say, during recovery from anæsthesia, a satisfactory alternative to the BLB oronasal mask can usually be made by plugging up the 7 mm. hole with a conical spigot.

Horton Emergency Hospital. M. D. NOSWORTHY.

SHELTER LEGS

SIR,—Your annotation of March 11, referring to my article in *The Lancet* (1940, ii, 744) which drew attention to the frequency and dangers of shelter leg, rightly urges continued bunk accommodation in shelters. Dr. Graham-Bonnalie's letter gives a warning of the risk of more cases in the event of renewed air-raids. My own figures do not suggest any increase in pulmonary embolism as a complication of the condition as yet. Coincident with the provision of bunks the incidence of fatal pulmonary embolism fell to normal, and there it has remained since. The number of such deaths for the September and October months of 1939 to 1943, excluding cases of criminal, accidental, maternal and newborn deaths were:

1939	*1940*	*1941*	*1942*	*1943*
4(0) ..	24(21) ..	5(0) ..	4(0) ..	3(0)

The proportion of shelter cases (the figure within parentheses) is seen to be high only during the blitz of September–October 1940, when the condition was first reported. The provision of bunks appears to have disposed of the risk almost entirely. Your annotation, however, gives timely warning of the possibility of its recurrence if there is any return to shelter life.

Guy's Hospital. KEITH SIMPSON.

NURSERY SCHOOLS AND CLASSES FOR YOUNG CHILDREN

SIR,—I wholeheartedly agree with the opinion expressed (March 4) by Dr. Janet Aitken, as president of the Medical Women's Federation, that the responsible staff of nursery schools or classes should have had special training and experience in the handling of young children both from the mental and physical aspects, and also have had a grounding in practical hygiene, and that there should be close coöperation with the various health services. At the same time it is arguable whether children can best be accommodated in nursery schools or classes. It should be possible to attain these ends in a nursery class just as well as in a nursery school. Nursery schools or classes should be within easy reach of the child's home, and if the principle of nursery schools is rigidly adhered to it may involve the establishment of small schools difficult to supervise from the health point of view. Furthermore, the young child placed in a nursery school will have to change his school at the age of 5—an interruption of continuity which is undesirable.

Experience of nursery classes attached to infants schools has shown that the right emphasis can be secured in such classes. It is by no means the case that the main interest is in education rather than health.

A. A. E. NEWTH,
Nottingham. Senior MO, City Education Committee.

MECHANICS OF HEAD INJURIES

SIR,—The contribution of Mr. Holbourn to the mechanism of head injury (*Lancet*, Oct. 9, 1943, p. 438) is most interesting and opens many new possibilities of approach to this problem. Certain points, however, deserve more comprehensive study to test their accuracy. It is not clear what is meant by "injuries of long duration." If this implies that the developed theory applies only to injuries lasting a fifth of a second or longer, the condition is not comparable to the usual dynamic head injury, since with ordinary hammer blows the duration of the blow has been found to be of the order of a fiftieth of a second or less.

The presence of attachments of the "gelatin brain" to the "paraffin skull" is undoubtedly the cause of the contrecoup pattern of shear stresses as seen in his figures 2 and 3, but such connexions are not present in the human and experimental brain. The pia and arachnoid do not move in relation to each other. If such a movement were theoretically possible, a tear of the arachnoid seems more likely than injury of the pia. It is true that in

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the median plane of the head the pia-arachnoid becomes attached to the dura along the passage of the blood-vessels, but more laterally or in a parasagittal position this is not the case. In the use of gelatin models a three-dimensional problem has been reduced to a two-dimensional one. Forces in the third dimension are apt to affect shear stresses materially.

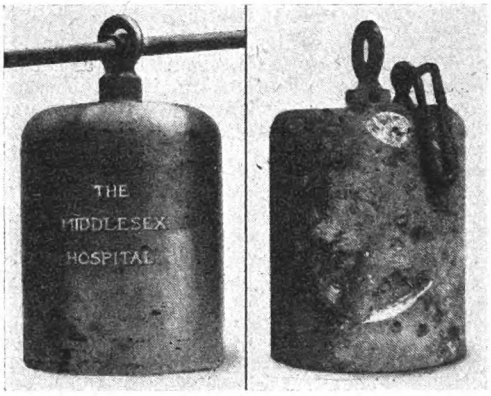
The application of photo-elastic principles to a non-elastic material such as the brain may lead to error. The brain, being non-elastic, does not have a straight line stress-strain relationship which is a prerequisite for the determination of shear strain by the photo-elastic method. Therefore the shear strain in the brain may be markedly different from the pattern obtained by the gelatin model. It is not clear why tensile strains may not be the important factor in the causation of lesions instead of shear strains.

In dynamic head injury with a blow lasting a fiftieth of a second or less, producing linear acceleration, there is a steep pressure gradient through the brain in the direction of the blow. This will cause shear strains. This is not comparable to hydrostatic or equal three-dimensional pressures which may obtain with blows of long duration.

E. S. GURDJIAN,
Department of Surgery.
Wayne University, Detroit, Mich.
HERBERT R. LISSNER,
Asst. Professor, Engineering Mechanics.

RADIUM SAFETY

SIR,—It was recommended in your issue of Jan. 13, 1940 (p. 98), that in view of enemy action radium should be stored in mild steel containers. The illustration shows the container adopted at the Middlesex Hospital (inside is a brass cylinder), and a similar container which



was within a few feet of a bomb when it wrecked the Marie Curie Hospital. The radium was found intact. It will be noticed that impacts have dented or furrowed the container, but mild steel once more belies its name by resisting a big breaking shock.

Barnato Joel Laboratories, Middlesex Hospital.
SIDNEY RUSS.

SHALL BASSINI DIE?

SIR,—I would like to join with Greenwood and Holman in advocating the filigree operation. This operation is not used as a routine but is reserved for selected cases of the following types:

1. Direct hernias of both types.
   (*a*) Lenticular type, where there is no sac as such, but just a diffuse saucer-like bulging of the posterior wall of the inguinal canal.
   (*b*) Tubular type, where there is a definite sac protruding through a hole or weakness of the fascia transversalis.
2. Recurrences of both direct and indirect types.
3. Indirect hernias, where at operation a definite weakness of the posterior wall has been found and the patient is thus considered to be a candidate for a direct hernia in later years.
4. Large scrotal hernias, where the internal abdominal ring has been so enlarged and pulled upon that it is encroaching on the posterior wall of the canal.

The filigree operation is a neat, quick and efficient method of repair and has proved eminently satisfactory in the cases enumerated above. The patients reporting at this hospital for the repair of inguinal hernia are mostly engaged in the heavy industries connected with the river-side docks. In such cases the abdominal musculature is subjected to many and various stresses and strains, which provide a good test for the repaired hernia. In a series of 50 consecutive filigree operations performed at this hospital over the last 4 years, I have met with only one recurrence. This was in a case which had been operated on elsewhere years ago, and in which only one filigree had been used. The recurrence was readily repaired by the insertion of a small oval filigree, especially designed for this purpose. Recurrences are treated in this way, and not by removal of the filigrees. Attempts at removal are quite misguided, and would try the patience of the most placid surgeon as well as lead him into unnecessary difficulties. The method described by McGavin and later modified by Cole has been strictly adhered to, and I would stress here the necessity for the second (superficial) filigree, the omission of which may bring the method into disrepute through recurrences. By the use of the second filigree the operation becomes something more than merely a reinforced Bassini. One further point—at each operation a choice of different sizes of filigree must be available (not merely two) so that the two most suited to the particular case may be used.

Criticism of this operation is based largely on theory and the fear of unfavourable consequences, such as perforation of the bowel, strangulation of the cord or bowel between the two filigrees, or consciousness of the filigree by the patient when the thigh is flexed, consequences which in fact have not been met with. Should such complications occur, it is the operator and not the operation that is at fault.

Tilbury Hospital.
M. R. MORLEY.

SEX RATIO

SIR,—I have just come across the following sentence which may explain the generally accepted fact of the preponderance of male over female births during war. "En général les conditions de vie défavorables à la nutrition font apparaître plus de mâles que de femelles." The quotation is from "L'analyse mentale en pratique médicale" by Austregesillo. The generalisation follows a summary of some experiments on lizards described by Curt Thiessen in "La sexualité dans l'univers." If however the observations are correct they may well have a wider application. It would be interesting to know whether males outnumber female births in wars which have not affected the nutrition of the population concerned, but probably statistics are not available.

Guildford.
HILDA DE PEYER.

INFECTIOUS DISEASE IN ENGLAND AND WALES

WEEK ENDED MARCH 4

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 8 (1 in Bedford, 1 in Finchley, 6 in Ruislip Northwood); scarlet fever, 1997; whooping-cough, 1914; diphtheria, 681; paratyphoid, 4; typhoid, 3; measles (excluding rubella), 1987; pneumonia (primary or influenzal), 983; puerperal pyrexia, 154; cerebrospinal fever, 53; poliomyelitis, 6; polio-encephalitis, 4; encephalitis lethargica, 1; dysentery, 218; ophthalmia neonatorum, 69. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on March 1 was 1734. During the previous week the following cases were admitted: scarlet fever, 122; diphtheria, 46; measles, 70; whooping-cough, 61.

Deaths.—In 126 great towns there were 1 (0) deaths from an enteric fever, 2 (0) from scarlet fever, 2 (0) from measles, 13 (4) from whooping-cough, 13 (1) from diphtheria, 56 (6) from diarrhœa and enteritis under two years, and 50 (3) from influenza. The figures in parentheses are those for London itself.

Leeds reported the fatal case of enteric fever.

The number of stillbirths notified during the week was 244 (corresponding to a rate of 33 per thousand total births), including 33 in London.

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Obituary

ARTHUR DONALD GRIFFITH

MB LOND, FRCS

Mr. A. D. Griffith died suddenly on March 5, at the age of 61, in Westminster Hospital where he was senior ophthalmic surgeon. He came of a distinguished legal family and his opinion was valued in the deliberations of the council of the Medical Defence Union.

Griffith entered King's College Hospital with a Sambroke exhibition and after qualifying in 1905 held house-appointments there and at the Royal Free, before his friendship with the eccentric genius Malcolm McHardy centred his interest in ophthalmology. He was appointed to the honorary staff of the Royal Eye Hospital in 1909, the year in which he gained his FRCS, and his affection for the hospital was lasting. He had held every post there from house-surgeon to senior surgeon, as dean of the medical school he had done much to develop its teaching facilities, and some of his last thoughts were of its affairs. At the Westminster he took the same friendly interest in every member of the hospital, and the hours he spent in committee of the students' sports club were happy ones, for in his youth he had himself played most games and he remained a keen tennis player and shot.

In the last war Griffith served in the Middle East as senior ophthalmic officer to the Malta Command, as officer in charge of the military hospital at Hamrun, and as surgical specialist to the British Salonika Force. Later he was appointed senior MO for the Faenza area of Italy and here he laid the foundation of his wide knowledge of Italian history, art, politics and life. Here, too, he met his Italian wife, Aurora, daughter of the late Conte Mocenigo Soranzo of Venice. After the war on his return to London he continued to serve his old comrades and new friends as a consultant at the St. David's Home for Disabled Soldiers and at the Italian Hospital.

L. H. S. writes: "Griffith was one of those rare people tolerant of others yet never satisfied with anything short of perfection in himself. He was generous and chivalrous to a fault, and in committee work he would never suffer any lack of consideration or humanity, or the slightest perversion of truth. His beautifully formed, precise handwriting was characteristic. He found the same pleasure in making a perfect capital letter as in admiring the perfect curves of old glass-ware in his collection. This artistic sense he applied to his ophthalmic operating, and it was a joy to watch the delicate yet resolute deliberation with which he made a cataract section, or his perfect scleroconjunctival flap in a Lagrange sclerectomy. He would have been the first choice of his many house-surgeons at the Royal Eye Hospital, if they had had to pick a surgeon for an operation on themselves. Yet in spite of this it was not so much as an operator that he excelled as in his breadth of reading, knowledge, and judgment. He wrote little, and what he wrote his search after perfection would make him rewrite over and over again, but he will be remembered for articles on binocular vision in squint, on headache, and on his pioneer work in the treatment of glioma retinæ with radium.

HENRY C. MAUDSLEY

KCMG, CBE, MD LOND, FRCP

Sir Henry Maudsley died, on March 6 at the age of 84, in the Royal Melbourne Hospital, to which he was consulting physician. During the last war he commanded the 1st Australian General Hospital at Heliopolis, visiting Mudros and Gallipoli later as consultant to Australian headquarters.

Henry Carr Maudsley was born at Stainforth in Yorkshire, the eldest son of Thomas Maudsley. He qualified from University College Hospital in 1880 and held resident appointments at that hospital before he set out for Melbourne where the rest of his life was to be spent. He was appointed to the staff of the Royal Hospital in 1903, and here his chief interest lay, but he was also physician and pathologist to the Alfred Hospital and lecturer in medicine at the University. He married in 1890 Miss Grace Elizabeth Stretch who died in 1933. They are survived by a daughter and a son, another Dr. Henry Maudsley, FRCP, who is psychiatrist to the Royal Melbourne Hospital.

IAN GALBREATH McCALL

MB ST. AND.; CAPTAIN RAMC

THE death of Captain Ian McCall in a bathing accident while serving as a regimental medical officer with the Central Mediterranean Force has been announced. After a long day attending to casualties he had gone for a dip, but he did not return and was not missed till some time later. The elder son of Mrs. McCall and the late Mr. Duncan McCall, MIME, of Calcutta and Dundee, he was educated at Dundee High School. After graduating MB from St. Andrews in 1938 at the age of 24, he was appointed senior casualty officer at Dundee Royal Infirmary, and later house-physician at the Beckett Hospital, Barnsley. While he was acting as anæsthetist there war broke out, and he volunteered at once. McCall served in India, in an ambulance unit in the Middle East, in North Africa, in the Sudan and finally with the CMF. A friend writes: Ian McCall found life well worth living, and was always brimfull of energy, which he put to good use in the service of his fellows. An RMO has to stand up to criticism—some just, perhaps more unjust—but among the NCOs and men of his regiment McCall had stilled adverse criticism, and established himself as one who had their best interests at heart.

WILLIAM HUNTER LANG

MB GLASG.; CAPTAIN RAMC

Captain W. Hunter Lang, elder son of Mr. Douglas H. Lang of Glasgow, died in December of wounds received at the Battle of Sangro. He joined the RAMC in July, 1942, and was posted to North Africa with the First Army where he served in hospital trains and field ambulances. Later as a battalion MO he saw heavy fighting in the concluding stages of the Tunisian campaign. When his battalion was transferred to the Eighth Army he was moved to Italy and took part in the landing at Termoli.

Ellis, Glasgow

Born twenty-four years ago, Hunter Lang was educated at Glasgow High School and Glasgow University, where he graduated in 1941. Before joining the RAMC he was house-surgeon to Mr. A. M. Clark in Glasgow Royal Infirmary. Rarely perturbed, he already had that calm confidence which begets trust both from patients and friends. He was keen on all he did—whether work or sport. He played golf well and was a good swimmer.

SMALLPOX IN MIDDLESEX.—A further case of smallpox has occurred at the Mount Vernon Emergency Hospital, Rickmansworth. The patient, an unvaccinated youth, was under observation. Two further cases at Finchley are the sisters of a fatal case already reported. Neither of the sisters had been vaccinated at the time of infection. A fourth and doubtful case has been removed to hospital from Paddington. All the patients were known to be contacts and were under surveillance.

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Notes and News

OCCUPATIONAL THERAPY IN THE FRONT LINE

A CONVALESCENT depot run by the New Zealanders in the South Pacific front line has been highly successful, and is returning 95% of patients to their units as grade 1 men. Those admitted are wounded, sick or the victims of accidents, and they are reabled on the spot, in both the temporal and spatial sense. Many of the staff of the centre have worked in a remedial centre in a hospital at Rotorua, NZ, which treated military cases from all over New Zealand. The men have a programme of sports, exercises and recreations; they can attend classes in book-keeping, metal work and handicrafts, or can walk, play, read or learn something about gardening. Those who have lost a limb get preliminary training in a craft, and can then be transferred to one of the new centres for the treatment of disabled soldiers in New Zealand.

Royal College of Surgeons of England

At a meeting of the council held on March 9, with Sir Alfred Webb-Johnson, the president, in the chair, Prof. W. E. Gye, FRS, was appointed Imperial Cancer Research Fund lecturer for 1944.

The following diplomas were granted jointly with the Royal College of Physicians:

DOMS.—H. F. Chard, P. J. Devlin, C. J. Evans, J. C. Greenwood, Arnost Hirtenstein, Anthony Hollingsworth, Lettice M. Hughes, Philip Jardine, R. L. Kerr, Monica Low, H. F. Melhuish, F. R. Neubert, R. E. Packer, C. L. D. J. Schepens, A. S. Scott, Elizabeth D. L. Simpson and Herman Treissman.

DMR.—D. T. Burke, Otto Englander, Karel Mendl, Maurice Sheehan and E. W. Spencer.

Voluntary Hospitals and the White Paper

Representatives of 1100 voluntary hospitals recently attended a London conference organised by the British Hospitals Association to consider proposals in the white-paper on "A National Health Service." They unanimously passed a resolution, proposed by Lord Southwood, declaring:

That the suggested administration does not constitute that partnership between local authorities and voluntary hospitals which has been the avowed intention of successive Ministers of Health, and which is an essential requisite to the effective participation of the voluntary hospitals and therefore to the accomplishment and efficiency of the scheme, and does not (except partially in the case of Scotland) furnish a suitable organization.

That the financial proposals are inconsistent, and also unacceptable, in that they afford part payment only to the voluntary hospitals for their services rendered under the scheme, while postulating that the financial gap thus caused must be filled by benefactions and other voluntary gifts, and, at the same time, by the offer of free service for all destroy the incentive of the public as a whole either to give or contribute.

London County Council

Mr. Somerville Hastings was elected chairman of the London County Council on March 7. The following medical men and women have been appointed to the standing committees of the council:

Civil defence and general purposes committee: Dame Barrie Lambert.
Education committee: Dr. J. A. Gillison, Dame Barrie Lambert, and *Dr. E. P. Hulbert.
Hospitals and medical services committee: Dr. S. Monckton Copeman, Dame Barrie Lambert, Miss Esther Rickards, *Dr. Stark Murray and *Dr. E. P. Hulbert.
Housing and public health committee: Dr. S. W. Jeger.
Mental hospitals committee: Dame Barrie Lambert and *Dr. Doris Odlum.
Supplies committee: Dame Barrie Lambert.
Special committee on staff (appeals): Dame Barrie Lambert.
* Coöpted member.

Sydney Ringer Lecture

The fifteenth of these biennial lectures will be given at University College Hospital medical school, London, W.C.1, on Tuesday, March 21, at 4 PM, when Prof. A. A. Miles will speak on the epidemiology of wound infection.

Research at Papworth and Enham

The medical consultative committee for the associated village settlements of Papworth and Enham, which meets under the chairmanship of Group-Captain R. R. Trail, the hon. medical director, has set up a committee to advise on the direction of research work at the settlements and to coördinate their work with other investigations on tuberculosis in this country. The members of the research committee are: Sir Arthur MacNalty (chairman), Sir Joseph Barcroft, FRS, Prof. S. P. Bedson, FRS, Dr. F. R. G. Heaf, Sir John Ledingham, FRS, Prof. W. H. Tytler and Prof. O. L. V. de Wesselow.

Venereal Diseases

In a lecture delivered to the Royal Institute of Public Health on March 8, Dr. A. H. Harkness said that there are great hopes for the future in the use of penicillin for gonorrhœa, and it may also have a definite place in the treatment of syphilis. Unfortunately it did not pass freely from the blood into the cerebrospinal fluid. He did not think the increase of venereal diseases during the war has been as great as the official figures indicate. Records were more accurate. The accommodation of Government VD clinics was often unsuitable, and in his considered opinion a large proportion of the medical personnel were grossly inefficient. Much could be said for divorcing gonorrhœa from syphilis and allying the former to the urologist. "The campaign of enlightenment and early treatment ('preach and treat') has failed, and will continue to do so until the public is educated in the methods of early and late preventive treatment and until there is compulsory notification (by numbers and not names) of all these diseases."

Royal Society of Medicine

On Thursday, March 23, at 4.30 PM, at the section of urology there will be a discussion on the treatment of carcinoma of the prostate, when Mr. Clifford Morson, Prof. E. C. Dodds, FRS, and Dr. W. M. Levitt will be the opening speakers. On March 24, at 3 PM, at the section of epidemiology and state medicine Major T. M. McNair Scott, USAMC, Dr. W. H. Bradley and Dr. William Gunn will open a discussion on parenteral diarrhœa. The section of disease in children will meet the same day at 4.30 PM at the Hospital for Sick Children, Great Ormond Street, W.C.1.

Biochemical Society

The annual general meeting will be held at the Courtauld Institute, Middlesex Hospital, London, W.1, on Saturday, March 25, at 2.30 PM.

The Minister of Health will address the Institute of Hospital Almoners at their annual general meeting on Friday, March 24, at 6 PM, at the Caxton Hall, Westminster, S.W.1.

Births, Marriages and Deaths

BIRTHS

GANGE.—On March 5, in London, the wife of Dr. Christopher Gange—a daughter.

KENYON.—On March 10, in Manchester, Dr. Marjorie Kenyon (née Landau), the wife of Mr. Ralph H. Kenyon, FIC—a daughter.

LYCETT.—On March 5, at Crickhowell, Brecon, the wife of Squadron-Leader, C. D. L. Lycett, MB, RAFVR—a daughter.

MACKIE.—On March 8, the wife of Dr. Carmichael Mackie, of Stourport-on-Severn—a daughter.

MASON.—On March 4, at Romford, the wife of Lieutenant A. S. Mason, RAMC—a son.

MOWLL.—On March 6, the wife of Dr. R. F. Mowll, of Surbiton—a son.

PHEILS.—On March 7, the wife of Captain Murray Pheils, RAMC—a son.

POELS.—On March 4, at Woking, the wife of Surgeon Lieutenant P. J. Poels, RNVR—a son.

RYDER RICHARDSON.—On March 11, at Whitchurch, Bucks, the wife of Dr. J. C. Ryder Richardson—a son.

SCADDING.—On March 2, in London, the wife of Captain F. H. Scadding, MD, RAMC—a son.

SQUIRE.—On March 7, at Chartridge, Bucks, the wife of Dr. Michael Squire—a daughter.

MARRIAGES

GOWANS—MORRIS.—On March 6, at Cleveland Heights, Ohio, USA., James Dakers Carrie Gowans, MB, surgeon lieutenant RN, to Hannah Morris.

RICHARDSON—INNES.—On March 4, at Perth, Frank McLean Richardson, DSO, MD, lieut-colonel RAMC, to Sylvia Innes.

DEATHS

ATKINS.—On March 9, at Bathampton, Bath, Ernest Atkins, MRCS, LSA, formerly of Plumstead, Kent, aged 84.

BARKWORTH.—On March 5, at Bromley, Kent, Henry Smith Barkworth, MRCS, aged 83.

GONDAL.—In Bombay, HH Sir Bhagvat Sinhjee, Maharajah of Gondal, GCSI, GCIE, MD EDIN., DCL OXFD, FRCPE, aged 78.

GOULD.—On March 7, in London, Edith Louisa Gould, MB LOND., of Goodmayes.

HUGHES.—On March 6, William Hugh Hughes, MB, B SC EDIN., of Ashton-under-Lyne, aged 79.

ORR.—On March 9, at St. Andrews, James Orr, MB EDIN., MRCPE, director of James Mackenzie Institute.

PARTRIDGE.—On March 8, at Shipley, Sussex, William Thomas Partridge, MRCS, aged 84.

WATTERS.—On March 8, at Haywards Heath, George Thomas Brown Watters, MD EDIN., aged 90.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export.

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CORNEAL VASCULARISATION IN NUTRITIONAL DEFICIENCY

T. KEITH LYLE, M D, M CHIR CAMB, F R C S, M R C P
WING-COMMANDER RAF

T. F. MACRAE
PH D, D SC GLASG
SQUADRON-LEADER RAF

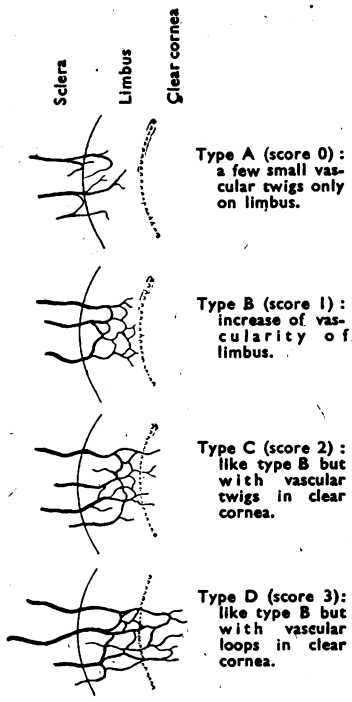
P. A. GARDINER
M B LOND, D O M S
FLIGHT-LIEUTENANT RAF

Bessey and Wolbach in 1939 reported vascularisation of the cornea and other ocular signs in rats deprived of riboflavin. El-Sadr (1939), working at the Lister Institute, had independently come to similar conclusions and had observed rapid disappearance of all ocular signs, except cataract, when riboflavin was administered to the deficient animals. In the following year ocular manifestations of riboflavin deficiency in human subjects were observed by Sydenstricker and his colleagues (Kruse et al. 1940, Sydenstricker et al. 1940). Among them were corneal vascularisation, circumcorneal injection, corneal opacity, iritis, cataract, conjunctivitis, blepharitis, and photophobia. In the rat corneal vascularisation is the earliest sign and it has been considered the earliest in human beings also. Many nutrition workers regard it as a specific sign of this deficiency.

During the past two years the relationship between corneal vascularisation and nutritional status in RAF personnel has been investigated in 22 localities, 10 in Great Britain and 12 overseas. In some localities the standard of feeding was very good while in others it was less satisfactory either because of lack of local supplies or because importation of some desirable foodstuffs was impossible. Nearly 4000 subjects have been examined, and at selected stations the effects of supplementing the diet have been studied.

RESULTS OF SURVEYS

The nasal, inferior and temporal quadrants of both eyes were examined and four types of vascularity were recognised (see figure). A method of scoring was employed to indicate the state of the limbus. A score was allocated to each of the 6 quadrants examined (3 in each eye) according to the type of vascularity observed, the scores for types A, B, C and D being 0, 1, 2 and 3 respectively. The total score for an individual was obtained by adding the scores of the 6 quadrants. Thus a subject with the lowest degree of vascularity in all quadrants (type A) would have a total score of 0, while one with the highest degree in all quadrants (type D) would have a score of 18.


Sclera
Limbus
Clear cornea
Type A (score 0): a few small vascular twigs only on limbus.
Type B (score 1): increase of vascularity of limbus.
Type C (score 2): like type B but with vascular twigs in clear cornea.
Type D (score 3): like type B but with vascular loops in clear cornea.
Classification of degree of vascularity of the cornea.

At British stations (4 in England and 6 in the Highlands and Islands of Scotland) the Service rations are considered nutritionally satisfactory. Green vegetables are scarce in winter and early spring at some stations in Scotland, but even where the shortages are greatest they are not serious enough to affect the general standard of nutrition. Table I summarises feeding and climatic conditions at each of the overseas stations.

Nearly all the subjects examined were airmen, though a few airwomen and officers were included. Most were between 20 and 30 years of age. Only subjects who had been 6 months or more in the locality were examined. No special selection was made except that individuals

TABLE I—RESULTS OF SURVEYS OF CORNEAL VASCULARISATION AT HOME AND ABROAD

Locality	Food	Time of tests	No. examined	Average score	Scores of over 6
Stations in Great Britain (average)	See text	Throughout year	2016	5·1	444 (22 %)
Stations overseas and climate—					
A—Sub-arctic	All milk, much meat, all fruit, and nearly all vegetables and potatoes tinned. A few fresh lettuces and tomatoes in summer. Fair supply fresh fish. No eggs. Ascorbic acid issued	July–Oct.	616	5·7	160 (26 %)
B—Summer, hot, dry; winter, pleasant, some rain	All milk, meat, fish, and fruit tinned; some fresh tomatoes and vegetables. Ascorbic acid	Feb.	101	6·6	41 (41 %)
C—Desert. Summer, temp. high; winter, pleasant, dry	No fresh vegetables, fruit, or fish; rarely fresh meat. Biscuits in place of bread. No eggs. Ascorbic acid	Jan.	89	6·2	38 (43 %)
D—Similar to C	Excellent. Ample supplies oranges and other fruit; fresh vegetables and potatoes. Fresh meat and some fresh fish. Eggs abundant	Jan.	102	4·4	17 (17 %)
E—Similar to C	Similar to D	Dec.	50	4·9	14 (28 %)
F—Tropical desert. Hot, dry; summer, very hot	Satisfactory, but not as good as at D and E. Fruit and vegetables good in winter, poorer in summer. Fresh meat, poor quality. Plenty of eggs	Dec.	50	5·3	18 (36 %)
G—Similar to F	Few fresh vegetables; limes 3 months of year; some tinned vegetables. Liver ¼ lb. and about 6 eggs daily per man. Local meat, poor quality; some tinned meat. Plenty of milk. Ascorbic acid	Dec.	50	7·7	33 (66 %)
H—Semi-desert. Summer, hot, high humidity; winter, pleasant	Fresh vegetables, moderate in winter, poor in summer; little fresh fruit, mainly pomegranates and dates. Potatoes sometimes scarce; plenty of dried apricots and eggs. Fresh meat	Dec. and Jan.	100	5·7	38 (38 %)
I—Similar to H	Similar to H	Dec.	100	6·2	41 (41 %)
J—Similar to H but hotter	Nearly all vegetables and fruit tinned; dried potatoes, sometimes poor. Some fresh meat and fish; fair supply fresh eggs. Dried apricots plentiful	Dec.	100	7·2	66 (66 %)
K—Tropical. Always hot; much rain April–Oct.	Excellent. Abundant fresh fruit and vegetables. Fresh meat and some fish. Plenty of eggs. Peanuts supplied	Nov.	100	5·3	34 (34 %)
L—Tropical. Always hot; less rain than at K	Tinned vegetables and fruit, little fresh. Some fresh meat, poor; much tinned meat. No fresh fish or eggs. Peanuts and ascorbic acid issued	Nov.	104	8·7	78 (75 %)

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showing local areas of corneal vascularisation due to an active or healed organic lesion of the cornea (such as keratitis or corneal ulceration) were excluded. Table I shows the numbers examined and the findings.

EFFECTS OF SUPPLEMENTING DIETS

Five experiments were completed, 3 in this country and 2 at station A overseas.

EXPT. 1. *Vitamin A, Riboflavin and Ascorbic Acid.*—This was carried out at a station in the south of England early in 1942. The subjects, who were not specially selected, had lived in civilian billets and consequently received rations similar to those of civilians. The vascularity of the corneas was determined. The men were then divided into 4 groups and given supplements of vitamin A, riboflavin and ascorbic acid (table II). After 21 days they were examined again. Those whose scores at the two examinations did not differ by more than 2 were classified as unchanged; those whose scores decreased by 3 or more were held to have improved; and those whose scores increased by 3 or more were taken as having deteriorated.

TABLE II—EFFECT OF RIBOFLAVIN, ASCORBIC ACID AND VITAMIN A (EXPT. I)

—	Group 1 No supplement	Group 2 Vitamin A 50,000 IU daily	Group 3 Riboflavin 4 mg. and ascorbic acid 100 mg. daily	Group 4 Riboflavin 4 mg. daily
Improved ..	14 (14%)	24 (13%)	32 (17%)	25 (25%)
No change ..	75 (73%)	149 (79%)	144 (75%)	72 (73%)
Deteriorated	13 (13%)	16 (8%)	16 (8%)	2 (2%)
Total ..	102	189	192	99

There was a significant improvement in groups 3 and 4 only. The apparent greater effect when riboflavin was administered alone (group 4) than when it was given with ascorbic acid (group 3) may have been due to chance.

EXPT. 2. *Riboflavin and Nicotinamide.*—This was carried out overseas at station A (table I) during the summer of 1942. The subjects were unselected and after estimation of the degree of vascularity of their corneas, the men were divided into 2 groups. For 20 days those in group 1 were given 10 mg. riboflavin daily while those in group 2 received 100 mg. nicotinamide. They were then re-examined (table III).

TABLE III—EFFECT OF RIBOFLAVIN AND NICOTINAMIDE (EXPT. 2)

—	Group 1 Riboflavin 10 mg. daily	Group 2 Nicotinamide 100 mg. daily
Improved	14 (23%)	8 (15%)
No change	36 (60%)	39 (74%)
Deteriorated	10 (17%)	6 (11%)
Total	60	53

Neither treatment produced a significant improvement in the groups taken as a whole. However, some of the subjects with the most definite corneal vascularity did improve while taking the supplements, especially riboflavin.

EXPT. 3. *Riboflavin, and Riboflavin with Other B Factors.*—For this experiment, at a station near London in the spring of 1943, 353 airmen were employed. They were not specially selected, and, unlike the subjects in experiment 1, had all received Service rations for some months. After preliminary examination they were divided into 3 groups. Group 1 received no supplement, group 2 received 10 mg. riboflavin daily, and group 3 a tablet containing 3 mg. aneurine, 3 mg. riboflavin, 50 mg. nicotinamide, 10 mg. calcium-*d*-pantothenate and 3 mg. pyridoxin. Table IV shows the results on re-examination after 28 days.

There was no significant difference in the 3 groups.

EXPT. 4. *Mixture of Highly Nutritious Foodstuffs.*—During the summer of 1942, 289 airmen at station A overseas were

TABLE IV—EFFECT OF RIBOFLAVIN AND A MIXTURE OF B-VITAMINS (EXPT. 3)

—	Group 1 No supplement	Group 2 Riboflavin 10 mg. daily	Group 3 Aneurine 3 mg., riboflavin 3 mg., nicotinamide 50 mg., Ca-*d*-pantothenate 10 mg., and pyridoxin 3 mg. daily
Improved ..	6 (5%)	6 (5%)	9 (7%)
No change ..	107 (92%)	106 (92%)	107 (88%)
Deteriorated ..	3 (3%)	3 (3%)	6 (5%)
Total ..	116	115	122

examined. Their diet, which had not been entirely satisfactory (table I), was then supplemented by daily addition of dried yeast (*Torula utilis*) 8 g., dried skimmed milk 17 g., dried eggs 9 g., orange-juice concentrate 48 g. (equivalent to about 200 g. fresh orange juice), dried carrot 10 g., dried cabbage 7·5 g., dried potatoes 51 g., and dried peas 18 g. The peas were sprouted before cooking. These supplements, it was calculated, added about 4000 IU vitamin A, 0·5 mg. aneurine, 0·8 mg. riboflavin, 4·5 mg. nicotinamide and 120 mg. ascorbic acid to the daily ration.

After 5 weeks the men were examined again. It was found that 45 subjects (16%) had improved, 27 subjects (9%) had deteriorated while 217 (75%) remained unchanged. The improvement in the group taken as a whole is statistically significant. Many of those with high degrees of vascularity (scores of 7 and over) showed striking improvement.

Interruption of the blood-stream (beading) in the vessels in the limbus and cornea was observed in 85 subjects (29%) at the end of the experiment compared with 12 (4%) at the beginning. It is a fairly reliable sign of improvement.

EXPT. 5. *Liver and Kidney.*—This experiment was carried out at a station in East Anglia in the spring of 1943. A group of 82 airmen who had been receiving Service rations were examined and their diet was then supplemented by about 230 g. liver and 115 g. kidney weekly; these supplements added about 1·5 mg. riboflavin daily. After 4 weeks they were re-examined. The supplements were then continued for a further 6 weeks, at the end of which the men were again examined; at this final examination only 50 were available. The administration of the liver and kidney caused no significant improvement. After 4 weeks 5 subjects (6%) showed improvement, 74 (90%) were unchanged, and 3 (4%) had deteriorated. After 6 more weeks 9 (18%) showed improvement, 33 (66%) no change, and 8 (16%) deterioration compared with the original degree of vascularity.

DISCUSSION

Table I shows a correlation between the standards of feeding at the different stations and the degrees of corneal vascularity of the personnel; vascularity was least where the food was good and most where it was less satisfactory. At stations where the highest scores were observed (G, J and L), most of the food served was tinned, but the main deficiencies in the rations were in fresh vegetables and fruits. Where fresh foodstuffs were available and there was an abundance of good vegetables and fruits (stations D, E and K) little corneal vascularity was observed. Indeed, the supply of fresh foodstuffs, particularly fruit and vegetables, seemed to be the main factor governing the state of corneal vascularity.

The results of the surveys strongly suggest, however, that riboflavin is not the only nutritional factor needed to maintain a low degree of vascularity. For example, at station G the food served was abnormally rich in riboflavin, owing to the inclusion of large amounts of liver, eggs and milk. The liver alone must have contributed about 4 mg. to the daily ration, and each man's total intake must have exceeded 5 mg., which is at least double the amount considered necessary for optimal nutrition. Nevertheless the degree of corneal vascularity in the personnel at this station was the second highest observed. In Great Britain the intake of riboflavin, determined by analysis of the food served, averages 1·8 mg. per man daily, and is thus much lower than at station G; yet there is comparatively little corneal

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vascularity amongst RAF personnel. The fact that fruits and vegetables appear to be particularly effective in preventing this condition is further evidence that riboflavin is not the only nutrient involved, for these foodstuffs are not specially good sources of this factor. It seems unlikely that the B_2-vitamins other than riboflavin (nicotinamide, pantothenic acid, pyridoxin) are concerned, for the liver fed at station G must have supplied an abundance of all these factors. Ascorbic acid also seems to be ineffective as a preventive, for at stations G and L, where the most severe vascularity was seen, ascorbic acid tablets were consumed.

The degree of corneal vascularity seemed to be independent of climate. For example at certain desert stations (D, E and F) where the food was good there was little vascularity, while at others (G and J) high degrees were encountered. Stations K and L had similar climates, for at both stations it was hot throughout the year and there was much rain during about half the year; yet the state of the corneas of the personnel at these stations was very different, there being little vascularity at K where the food was good and much at L. Further, the degrees of corneal vascularity in Great Britain and at stations F and K in two parts of the tropics were very similar, the general standard of feeding at these stations being about the same.

The results of supplementing the diet (experiments 1–5) were not dramatic. Two of the reasons may be :—

1. At the stations where the experiments were carried out the degrees of corneal vascularity were not high.
2. The subjects were not specially selected to include only those with high degrees of vascularity. Some therefore had such slight vascularity that they could scarcely have been expected to improve.

The difference in results with riboflavin in experiments 1, 2 and 3 was probably due to the difference in the dietary histories of the subjects before the experiments. In experiment 1 a significant reduction in corneal vascularity in the groups considered as a whole followed administration of riboflavin, but in experiment 2 the improvement was only slight. In all experiments there were subjects with marked corneal vascularity who did not respond to treatment, and some even deteriorated. A larger number, however, did improve, and there is no doubt that riboflavin on the whole had some beneficial effect.

No definite evidence of improvement followed treatment with any of the other pure vitamins tried, including vitamin A, aneurin, calcium-*d*-pantothenate, pyridoxin and nicotinamide. The last appeared slightly beneficial in experiment 2, but this may have been due to chance.

The most definite benefit was obtained in experiment 4, in which the diet was supplemented by a good variety of nutritious foodstuffs. It is true that the number of subjects classified as improved was not large and there were some who actually deteriorated. However, after treatment, dramatic improvements were seen in some men and the numbers showing interruption of the blood-stream in the limbal and corneal vessels greatly increased. The beneficial effects in this experiment were clearly greater than those in experiment 2, carried out at the same station. The amount of riboflavin in the supplementary foodstuffs given was only about 0·8 mg. per man daily, whereas a supplement of 10 mg. riboflavin daily was administered in experiment 2. Consequently, the improvement in experiment 4 could not have been entirely due to riboflavin; indeed it is doubtful if this was even its main cause. The nature of the other beneficial factor was undetermined, and it may be that several are involved. Orange juice and vegetables seemed to be its most probable source.

Experiment 5 further indicates that riboflavin is not the main factor; though each man got liver and kidney supplying about 1·5 mg. riboflavin daily, no improvement was seen. It also supports the view that nicotinamide, pantothenic acid, pyridoxin, and the unknown factors of the vitamin-B_2 complex are not involved. It would have been surprising if these foodstuffs had been effective, for larger amounts of liver than those given in this experiment did not prevent corneal vascularisation at station G (table I).

Even in the communities where the feeding was very good there were some subjects with normal food habits who had blood-vessels in the cornea. Further, many with highly vascularised corneas did not improve when given riboflavin, other vitamins or mixtures of nutritious foodstuffs. It seems, therefore, that the presence of blood-vessels in the cornea is not definite proof that a man is nutritionally deficient. On the other hand, it is probable that men showing definite improvement on treatment were indeed deficient.

Throughout these investigations watch was kept for other ocular signs and symptoms which have been attributed to deficiency of riboflavin. A very small number of subjects (about 0·5% of those examined) showed signs of photophobia during the slit-lamp examination, but most of them were unaware of their disability. This condition was usually, but not always, associated with corneal vascularity. The incidence of blepharitis, which was nearly always associated with vessels on the cornea, was about the same. Three subjects with slight peripheral corneal opacity were encountered and all of them had corneal vessels. Only a very few complained of ocular symptoms and the complaints were by no means confined to those with vascular corneas. In striking contrast to our findings, Sydenstricker et al. (1940) found ocular symptoms prominent in their investigations.

In other communities riboflavin might prove more effective in the treatment of corneal vascularity than it has in our experiments, for we have made our observations on personnel mainly receiving Service rations, which always contain considerable amounts of fresh or tinned animal products and cannot be grossly deficient in riboflavin.

SUMMARY AND CONCLUSIONS

The degree of corneal vascularity was determined in about 4000 RAF personnel at 10 stations in this country and 12 stations overseas. The effect of supplementing the diet with riboflavin and other pure vitamins and highly nutritious foodstuffs was examined.

Many subjects receiving excellent dietaries had blood-vessels on the cornea, and subjects with much corneal vascularity did not always improve when the diet was supplemented. Hence vascularity of the cornea is not necessarily evidence of deficiency in the diet.

On the other hand, it was regularly found that there was little corneal vascularity where the food was good and more where food was less satisfactory. The average degree of corneal vascularity in a group of subjects is therefore a reliable index of their general state of nutrition.

Riboflavin is not the only nutrient concerned in the prevention of corneal vascularisation. Indeed these experiments suggest that other factors present in fruits and vegetables influence this condition more than riboflavin.

This work was carried out on the instructions of Air Marshal Sir Harold Whittingham, KBE, director-general of medical services, Air Ministry, and Air Commodore T. McClurkin, director of hygiene. We thank them for their interest and help.

We are grateful to Dr. A. C. Thaysen, Chemical Research Laboratories, Teddington, for supplies of food yeast, and also to the director and staff of the Low Temperature Research Station, Cambridge, and the head of the scientific advisors' division, Ministry of Food, for assistance in procuring supplies of dehydrated foodstuffs. The vitamin A was supplied by British Drug Houses Ltd. and all other vitamin preparations and control tablets by Roche Products Ltd.

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MEDICAL FILMS.—The Association of Austrian Doctors in Great Britain are showing two films—one on blood transfusion and one on the medical services of the Red Army—on Sunday, March 26, at 2.30 PM, at BMA House, Tavistock Square, London, W.C.1. Invitation cards from the Secretary, 14/15, Craven House, 121, Kingsway, W.C.2.

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ANÆSTHESIA IN FRACTURES OF THE JAWS

R. P. W. SHACKLETON, BA CAMB, MRCS, DA
ANÆSTHETIST, PLASTIC AND JAW UNIT, EMS

FROM the anæsthetist's point of view the outstanding problem of the recently fractured jaw is establishment and maintainance of the airway. Often this presents considerable difficulty. The displacement of bony and soft tissues, the presence of blood and other debris in the pharynx, and possible associated head injury and shock, make the restoration of a good airway of prime importance. In some cases until a good airway is established the chance of the patient's general condition improving is limited and the induction of general anæsthesia is impossible.

Patey and Riches (1943) frankly get over the difficulty by doing a tracheotomy under local anæsthetic in cases of "smashed in face," continuing thereafter with a general anæsthetic through the tracheotomy tube. In the delayed, already infected, case, which has developed a Ludwig's angina, Bennett (1943) practises blind nasal intubation in the conscious patient as a preliminary to general anæsthesia. Haugen (1941) holds that as many jaw injuries as possible should be done under regional block anæsthesia, but adds that cyclopropane is the nearest approach to the ideal agent in these cases. Other American writers are inclined to rely on local infiltration and regional block.

Kelsey Fry et al. (1942) maintain that the ideal is general anæsthesia by endotracheal route with the pharynx packed off. They feel that the difficulties from the often deficient airway can thus be overcome, and that it is worth achieving in this way unhurried and therefore more rapid surgery, greater safety to the patient, and almost complete elimination of the danger of inhalation of foreign material. With this view I am in complete agreement. This paper is an attempt to analyse the postoperative results in cases treated in an EMS plastic and jaw unit. All the anæsthetics were given by myself.

The series consists of 156 cases of jaw fractures untreated before admission to the unit: 113 patients sustained fractures of the mandible only; 30 fractures of the maxilla alone; and 13, of both mandible and maxilla. Of the 156, 108 were men and women of the Forces, and 48 civilians. The age-groups were:

Years—	*0–10*	*11–20*	*21–35*	*36–50*	*Over 50*
Patients	1	19	102	30	4

As would be expected considering the large preponderance of Service cases in the series most cases fall in the age-group 21–35 years. The youngest patient was 6 years old and the eldest 70. The causes of injury (where stated in my records) were: gunshot wound 11; bomb injury 15; accident 126. The immediate preoperative risks were: good 103; fair 46; poor 6; bad 1.

Though the treatment of a fractured jaw does not differ, from the point of view of surgical urgency, from that of fractures of other bones, there was considerable delay in some instances before admission to the unit, during which no treatment was carried out. Since we found an apparent relationship between the incidence of postoperative respiratory morbidity and the interval between injury and operation, with establishment of a free airway, this delay becomes significant. The average time between injury and operation (usually performed as soon as possible after admission) was 4·3 days; this was reduced to 3·6 days over the last year. Even in severe cases with evidence of respiratory danger from blood and other debris in the pharynx, the average was 2·9 days.

PREOPERATIVE CONDITION

As might be expected, some patients had associated head injuries, ranging from transient concussion to fracture of the skull. In many of these neurological opinion was sought and priority of treatment determined. A high incidence of head injury was noted where both jaws were fractured. Shock, needing treatment before operation could be undertaken, was present in 18. Respiratory obstruction, as shown by cyanosis and embarrassed respiratory movements, was noted in 15 cases; 12 cases gave a history of recent respiratory infection; 4 had signs of chronic bronchitis. The findings are analysed in table I. Several cases with extensive soft tissue injuries (mostly gunshot or bomb injuries) had lost much blood; 11 received transfusions of whole blood, which in 7 was continued during operation; 5 of the 11 received blood postoperatively.

Of the series, 52 (33%) had blood or other debris present in the pharynx before operation. This was noted in 34 mandibular fractures, 10 maxillas, and 8 fractures of both jaws. Severe obstruction to the airways resulted in 15 of these. As will be seen later, most of the postoperative morbidity was in this group.

TABLE I—PREOPERATIVE MORBIDITY

Site and no. of cases	Shock	Head injury	Respiratory obstruction	Respiratory infection
Mandible (113)	12 (10·5%)	13 (11·5%)	10	9
Maxilla (30)	4 (13·3%)	2 (6·6%)	1	1
Both jaws (13)	2 (15·4%)	8 (61·4%)	4	2
Total	18 (11·5%)	23 (14·7%)	15 (9·6%)	12 (7·7%)

TECHNIQUE

In most cases operation was undertaken as soon as possible after admission. Surgical treatment consisted of replacement and fixation of soft and bony tissue.

Premedication in 147 cases was with 'Omnopon,' usually grain ⅓, and scopolamine usually gr. 1/150 an hour before operation; in a few depressed cases a smaller dose was given. In 8 cases atropine gr. 1/100 only was used.

The patient was placed straight on the operating table before induction which in 140 cases was with intravenous 'Pentothal sodium.' Patey and Riches (1943) quote Ascroft as reporting several near accidents with pentothal in this type of case in the Middle East, but so far I have had no trouble following this practice. The dose needed was small, 0·25–0·5 gramme being sufficient. As soon as the patient lost consciousness a nasal airway (a no. 6 or 7 Magill tube cut down) was passed through the clearest nostril to a point beyond the base of the tongue and manipulated until a free respiratory exchange was evident. A mask was then applied and anæsthesia continued with a gaseous anæsthetic; my preference was for cyclopropane-oxygen and this was used where possible in all recently shocked cases, in those with pharyngeal debris who might have inspired blood, or in cases giving a recent history of respiratory infection. Supplies of cyclopropane however have often been short and for one considerable period were altogether lacking. Gas-oxygen-ether sequence, or induction with cyclopropane followed by ether maintenance, was used instead.

I have not been really satisfied with trichlorethylene (Gordon and Shackleton 1943) and this drug was used on only two occasions in this series. In 8 cases of simple mandibular fracture in otherwise healthy adults with a perfectly free airway and the minimum of surgical procedure, pentothal was continued throughout.

Occasionally soft-tissue injuries round the lips, cheeks and nose made accurate approximation of the mask difficult. Unfolded swabs wrung out in saline and laid on the defects usually produced an airtight fit. Anæsthesia was taken to the second plane of the third stage (Guedel) and in simple clean cases endotracheal intubation was then performed. The largest possible Magill tube was used in every case. Where blood or any debris was known to be present in the pharynx, suction toilet was performed before intubation. With a long wide-bore suction nozzle, especially made by Messrs. Thackray, tracheal suction was done in every case where inspection showed possibility of inspired blood being present, care being taken to release the vacuum by lifting the finger from the control hole at the slightest sign of closure of the cords round the nozzle. It was most revealing how often dark stale blood was aspirated from the trachea.

As soon as pharynx and trachea were considered clean, intubation was performed and the anæsthetic continued. The pharynx was packed with a sterile gauze bandage impregnated with soft paraffin. At first I used to attempt blind nasal intubation when I was convinced that the pharynx was clean and that there was no danger of carrying possibly

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infected material into the trachea with the tube, but direct inspection showed how often the pharynx was dirty, and latterly I have intubated all cases, whether by oral or nasal route, under direct vision. The choice of routes was naturally dictated by the surgical procedure; for fractured mandible nasal intubation, for maxilla the oral route, and where both jaws are involved usually the nasal route, because interdental fixation was often employed.

The pharynx was cocainised before intubation in 53 cases, a 20% solution being used. This measure was deliberately omitted where the airway was endangered by the presence of debris in the pharynx since unnecessary interference is then undesirable. In these cases anæsthesia was taken sufficiently deep for complete relaxation before passing the tube in order that suction toilet might be performed. Where there is no such need, and intubation is undertaken at a lighter level of anæsthesia, I think the pharynx should always be cocainised.

In dirty cases a more radical tracheobronthial suction toilet was performed after intubation by the technique described by Waters (1942). A 22 in. rubber catheter was passed down the endotracheal tube and by manipulation and gentle rolling of the patient an attempt was made to enter each main bronchus in turn. Considerable quantities of blood and mucus were on occasions aspirated by this means. Anæsthesia was thereafter maintained by closed circuit, carbon dioxide absorption technique with cyclopropane-oxygen or oxygen-ether. In the 2 cases in which trichlorethylene was used this was drawn from the bottle in the respiratory circuit of the absorber unit. When interdental wiring was used the pharyngeal pack had to be withdrawn before the final tightening of the tie-wires. The nasal endotracheal tube was left in place during this procedure. As soon as the wiring was completed the nasal tube was withdrawn in clean cases and a nasopharyngeal airway was inserted. In some dirty cases a final tracheobronchial suction toilet was performed before removing the tube.

DIFFICULTIES DURING ANÆSTHESIA

During the course of anæsthesia difficulties were mostly technical. Difficulty in maintaining the airway during induction was experienced in 32 cases, but was overcome in all. Intubation was hindered in 18 cases, either by anatomical abnormalities due to displacement of bony or soft tissues or by recent or persistent bleeding into the pharynx from the fracture site or from the damaged pharyngeal wall. Such obstruction was present in 15 cases. Submucous hæmatoma of the pharynx with occasional œdema in the region of the glottis, reducing the pharyngeal capacity or interfering with a direct view of the cords, caused some embarrassment. Obstruction was never severe and no true case of Ludwig's angina has so far been encountered, though in some delayed cases œdema and ecchymosis were considerable. In one case I failed to intubate; owing to severe limitation of jaw mobility laryngoscopy was impossible, and blind intubation failed. A nasopharyngeal tube was used with the oropharynx lightly packed.

Cardiac and respiratory complications during anæsthesia were slight, 3 cases exhibited pulse irregularities at some time during operation, 5 showed depressed respiration with periods of apnœa necessitating controlled respiration for not longer than 5 minutes in any case. One case showed both depressed respiration and extrasystoles, probably caused by cyclopropane. Signs disappeared on lightening the anæsthetic. One case, where trichlorethylene was used, developed bradycardia with rapid shallow respiration.

POSTOPERATIVE CONDITION

Two patients in the series died.

CASE 11.—A soldier, with considerable destruction of the right side of the face, including the maxilla, from a shell fragment. Surgery consisted in attempts to control hæmorrhage. He was judged too ill for anæsthesia and ligation of vessels in the neck was undertaken on two occasions under local anæsthesia. He died after a severe secondary hæmorrhage.

CASE 12.—An apparently healthy soldier who in civilian life had been a jockey, had a spontaneous subarachnoid hæmorrhage 4 days after the operation (replacement and interdental wiring for a single fracture of mandible). He was transferred to a neurological hospital, apparently recovered, but died after a second hæmorrhage one month later.

Vomiting.—The importance of reducing vomiting to a minimum in these cases is obvious. It has been said to be a real danger in cases where interdental wiring has been undertaken, and is one of the arguments against using general anæsthesia. In practice we found that in those few patients who did vomit no difficulty was experienced in expelling the vomitus through the gaps in the teeth, or through the nasal airway. Naturally careful nursing attention is necessary during the recovery period. The patient should be kept on one or other side during this stage. In one case only was vomiting severe enough to disturb fixation and alignment of the jaw fragments; 15 patients in all vomited, representing 9·6% of the series (table II).

TABLE II—POSTOPERATIVE MORBIDITY IN RELATION TO ANÆSTHESIA

Anæsthetic	Cases	Vomiting	Respiratory complications	Shock	Died
Pentothal induction	140	..	..	..	..
Gas-oxygen-ether	86	6 (7%)	2 (2·3%)	11(12·7%)	0
Cyclo-oxygen * ..	44	6 (13·6%)	7 (15·9%)	4 (9·9%)	1
Cyclo-oxygen-ether	15	2 (13·3%)	0	1 (6·6%)	0
Trilene-oxygen ..	2	1	1	1	0
Pentothal only ..	8	0	0	0	0
Local	1	0	0	1	1
Total	156	15 (9·6)	10 (6·4%)	18 (11·5)	2

* Most of the severe cases, with pharyngeal hæmorrhage, &c., were in this group.

The high incidence of vomiting after cyclopropane-oxygen anæsthesia (13·6%) as compared with those cases which had received gas-oxygen-ether sequence (7%) is contrary to usual experience. A possible explanation is that most of the severe cases which had blood or other debris in the pharynx were in this group, and had had ample opportunity for the swallowing of blood. In fact the postoperative vomitus commonly contained stale blood.

Respiratory complications.—Postoperative respiratory morbidity in the series was considerably higher than in other types of case passing through the unit. Any deviation from normal respiratory health has been included in the table, from simple cough with or without pyrexia and no physical signs, lasting a day or two, to serious thoracic diseases. Respiratory complications were present in 10 cases (6·4%). This may be compared with an incidence of 2·3% in over 3000 non-jaw cases, which I anæsthetised in this unit. Of the 10 cases, 9 had preoperative debris in the pharynx (table III). The

TABLE III—INCIDENCE OF POSTOPERATIVE RESPIRATORY SYMPTOMS

—	Cases	Postop. resp. morb.
Blood and debris in upper respiratory tract before opn.	52 (33·3)%)	9 (17·3%)
Clean cases	104	1 (1·0%)
Total	156	10 (6·4%)

incidence of complications in the cyclopropane-oxygen group was high (7 out of 44), but as 6 of the 7 cases showed abnormal chest signs before operation the figure is not perhaps of much significance when applied to the anæsthetic agent alone.

Further analysis of the 10 cases (table IV) shows the following points:

Besides debris in the upper respiratory tract 6 of them had preoperative râles or rhonchi in the chest. One of these had a collapsed lower lobe on admission, and one had patches of consolidation in one lung. The average time between the injury and operation in this group was 4·1 days compared with 4·3 for the whole series, but 2·9 for the group of 52 severe cases with debris in the pharynx (in which group, however, 9 of these cases are included). Treatment included sulphonamide therapy in all cases with rolling and coughing

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as described by Marshall and Foster-Carter (1943) when there was evidence of atelectasis.

TABLE IV—ANALYSIS OF 10 CASES WITH RESPIRATORY COMPLICATIONS

Case	Interval before op.	Debris in pharyn.	Preop. chest signs	Tracheo-bronch. toilet	Postop. chest signs	Result
1	3 days	++	Cough	Pharynx	Cough PS	Well
2	5 days	++ Infectn	Areas consolidn	Complete	Lung abscess. empyema.	Improving
3	48 hrs.	++	Râles +	do.	Pyrexia, râles 3 days	Well 1 wk.
4	18 hrs.	+	Nil	do.	Pyrexia, râles 4 days	Well 1 wk.
5	12 days	+ Infectn	Rt basal collapse	do.	Rapid improv.	Well 1 wk.
6	48 hrs.	+	Nil	do.	Atelectasis lt base	Well 1 wk.
7	24 hrs.	+	Cough	Pharynx	Cough	Well 4 dy.
8	14 days	Nil	Nil	Nil	Pyrexia, cough, no PS	Well 1 wk.
9	30 hrs.	+	Râles, rhonchi	Complete	Cough, râles	Well 4 dy.
10	3 days	+	Nil	Pharynx	Cough, râles	Well 1 wk.

PS = Physical signs

Shock.—There was evidence of postoperative shock during the recovery period in 18 cases. None was severe (save the soldier who died from secondary hæmorrhage) and all responded to treatment. Of these 18 cases who were treated for shock before operation 9 showed postoperative shock. Where operation lasted less than an hour there were no cases of shock. With operations lasting 1–1½ hours the incidence was 4·8%. For the groups 1½–2 hours and 2–3 hours (21 cases in each group) the incidence was 26·2%.

TABLE V—TOTAL POSTOPERATIVE MORBIDITY IN RELATION TO INJURY

Fracture	Shock	Respiratory complications	Vomit	Died
Mandible ..	9 (8·0)	8 (7·1%)	7	1
Maxilla ..	6 (20·0%)	0	7	1
Both jaws	3 (23·1%)	2 (15·4%)	1	0
Total ..	18 (11·5%)	10 (6·4%)	15 (9·6%)	2 (1·3%)

DISCUSSION

The high incidence of postoperative respiratory complications in those cases with debris in the pharynx before operation is the most significant fact to emerge from this review. That the incidence was no higher than 17·3% and that most of the cases were relatively trivial is, I suggest, partly due to the use of suction toilet. The value of this measure is well illustrated by the following case :—

CASE 5 (TABLE IV).—A soldier, aged 24, fell 50 ft. from a window 12 days before operation in this unit. Fractured base of skull, fractured frontal bone, mandible and maxilla. He was unconscious for a week and on recovery was found to have lost the sight of his left eye. Admitted to this unit 11 days after accident, still rather drowsy. Loose interdental wiring had been performed without anæsthetic. Much oral sepsis. Rattly cough with difficult expectoration. Complete collapse of right lower lobe. Temperature 100° F. Severe anæmia (Hb. 60%).

Operation.—Extraction of teeth in fracture line. Drainage of infected hæmatoma. Interdental wiring. Anæsthetic: omnopon, gr. 1/3, scopolamine, gr. 1/150, an hour before operation; pentothal 0·45 g. Slept quietly; nasal airway inserted; cyclopropane + oxygen to mid-third stage; suction toilet to pharynx; cords well open. Long rubber catheter passed into trachea and with patient on his right side pushed down until it was thought to be well into right main bronchus; suction applied and tube slowly withdrawn; much mucus aspirated; cords still relaxed. Right nasal intubation under direct vision; pharynx packed with soft paraffin gauze. Anæsthetic continued with cyclopropane and oxygen in closed circuit, with carbon dioxide absorption. Whole-blood transfused throughout operation and continued afterwards. Anæsthetic uneventful. Postoperative condition: no vomiting; quiet recovery; air entry to right base immediately after operation; good expansion by third day. Rolling and coughing 4-hourly for 24 hours. Good recovery.

The one serious postoperative respiratory case * was that of an ATS corporal with bilateral fractured mandible.

She had remained for 5 days untreated before admission to this unit. She had a grossly infected mouth and obstructed respiration from the position of her jaw and accumulated debris in her pharynx. She already had signs of patchy consolidation in her right lung. Suction toilet produced mucus but she subsequently developed a lung abscess (which she coughed up during postural drainage) and later an empyema which was drained after transference to a chest unit. She is considerably better but still has oral sepsis needing frequent cleansing and has undergone sequestrectomy of part of her mandible. She still has a discharging sinus in her chest.

Although the figures for postoperative respiratory complications and for vomiting as shown in table II are not exactly complimentary to cyclopropane anæsthesia this agent is still my choice for this type of case. Now that we are getting good supplies I have given up the use of ether for acute traumatic cases. The high oxygen concentration possible with cyclopropane in cases where anoxæmia may be present as a result of shock, or an obstructed airway is beneficial. But I suggest that in the case of the fractured jaw the patient's preoperative condition is of considerably greater importance than the anæsthetic agent in the causation of postoperation morbidity (table V).

Since scopolamine and atropine render mucus viscid it might have been wiser to have omitted them in premedication of these cases and to have relied upon pentothal and cyclopropane only. Similarly, depressants are to be avoided as the early return of the cough reflex is of great importance. Postoperative sedation was therefore reduced to a minimum. Another factor contributing to the retention of secretion in the respiratory tract is the mechanical difficulty in coughing and expectorating with the jaws wired together.

Early fixation is important. Delay is dangerous, particularly in those cases with respiratory obstruction or with potentially infected material in the pharynx. It has been our experience that accompanying head injury that does not itself need operation is no bar to operation on the jaw or to general anæsthesia. Ascroft (1943) has shown that head injuries travel well *before* operation.

SUMMARY

Preoperative conditions, anæsthetic technique, and postoperative complications are reviewed in a series of 156 patients undergoing primary treatment for fractures of the jaws in an EMS plastic and jaw unit.

When, from any cause, the integrity of the airway is affected its re-establishment and maintenance is of immediate importance.

The presence of blood or other debris in the upper respiratory tract leads to a high postoperative morbidity. The longer the clearance of such debris is delayed the more likely is the chance of pulmonary infection, and if established, the more serious will it be. Tracheobronchial suction toilet is an effective means of clearing the respiratory tract and lessening the incidence and severity of chest complications.

The apparent connexion between delay in treatment and respiratory morbidity is emphasised.

I should like to thank Sir Harold Gillies, consultant in plastic surgery to the Ministry of Health, and my surgical colleagues Mr. J. B. Cuthbert, Mr. M. A. Rushton, and Mr. R. Langston for their helpful advice and criticism.

* I have since had a case of pulmonary collapse which did not clear up under the suction technique described. Bronchoscopy was necessary before the condition resolved. The question of postoperative bronchoscopy was fully discussed at the Royal Society of Medicine on Feb. 4. I find myself allied with those who believe that it is only rarely necessary.

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NECROBACILLOSIS IN MAN

G. B. FORBES
M B ABERD; CAPTAIN RAMC
GRADED PATHOLOGIST

J. C. GOLIGHER
M B EDIN, F R C S, F R C S E
MAJOR RAMC; SURGICAL SPECIALIST

THE term necrobacillosis covers a wide variety of animal diseases due to infection with a gram-negative, non-sporing, filamentous anaerobe. An organism of this description has been recovered from the caseonecrotic lesions of equine bacillary necrosis, calf diphtheria, "foot rot" in sheep and pigs, labial necrosis in rabbits and hepatic necrosis in cattle. In all of these the basic pathological process is the same: there is a local lesion with a tendency to necrosis, and often metastatic abscesses develop in lungs and liver. The taxonomic position of the causative organism has not been definitely established and it is known by many names. Of these we prefer *Bacterium necrophorum*.

Though an important pathogen in animals, *Bact. necrophorum* has seldom been known to attack humans. The first recorded cases were in Leipzig where Schmorl (1891) and one of his assistants contracted local lesions while investigating labial necrosis in their laboratory rabbits. In both human and rabbit lesions they demonstrated in stained films a gram-negative beaded bacillus which they called *Streptothrix cuniculi*, and there can be little doubt that it was *Bact. necrophorum*. The same organism was first isolated in pure culture from a human case 20 years later when Stemen and Shaw (1910) recovered it from infected bullæ in the skin of a meat-inspector. In a monograph on Human Necrobacillosis Shaw (1933) managed to collect 22 cases from the literature, most of which he considered true *necrophorum* infections, including 6 cases of puerperal fever described by Harris and Brown (1927). As might be expected, infection was sometimes derived from contact with domestic animals, resulting in local lesions of hands and forearms. The organism has also been recovered from other widely separate situations in the human body. Thus Dragstedt, Dack and Kirsner (1941) have demonstrated it in ulcerative colitis, Chandler and Breaks (1941) in femoral osteomyelitis and Shaw (1933) in abscesses of lung.

The occurrence of abscesses at a distance from the primary lesion (or presumed portal of entry of the organism) in both human and animal infections has naturally led to the assumption that *Bact. necrophorum* is carried by the blood-stream. That a bacteræmia may in fact develop was demonstrated by Cunningham (1930) when he isolated *Bact. necrophorum* from the blood of a patient with infective arthritis and multiple lung infarcts. Buhler, Seely and Dixon (1942) have reported two cases of human necrobacillosis with positive blood-culture—appendicitis complicated by liver abscesses, and psoas abscess following a perforating wound of perineum. They claim that these cases are the second and third recorded instances of proved *Bact. necrophorum* septicæmia, but they admit that septicæmias resulting from infection with *Bacteröides funduliformis*, a closely related organism, have been reported abroad, notably by Lemierre (1936).

Case Report

Our patient was a stoker, aged 24, injured in a naval engagement on August 12, 1942, sustaining wounds of the right arm and fractures of both legs. No active surgical treatment had been undertaken on board ship, but he had been given morphine and tetanus antitoxin, his wounds had been dressed and his fractures splinted.

On admission to hospital on August 15 his general condition was reasonably good; temp. 98·4° F., pulse-rate 75. The wounds of his right arm were superficial and mildly infected. He had a closed fracture of both malleoli of the left leg, with only slight displacement, and an open fracture of both bones of the right leg just below their middle with a large soft tissue wound on the anterior aspect. This wound gaped widely, a considerable portion of skin having been avulsed; the extensor muscles were freely exposed, and were lacerated and infected. The tibial fracture was comminuted and there were several grossly displaced fragments of bone. There were no signs of damage to the main vessels or nerves.

TREATMENT

He was taken to the theatre 6 hours after admission. The leg was extended on a Böhler's screw traction frame. The wounds in the skin and fascia were enlarged at several points where tension was present or pocketing of pus seemed likely. Two or three bone fragments which were almost devoid of soft tissue attachment were removed. Sulphanilamide powder was then dusted over the entire raw surface and a soft-paraffin gauze pack and dressing applied. Finally the limb was enclosed in a plaster-of-paris cast from the toes to just below the knee. This was subsequently extended to the upper thigh on removal of the limb from the frame. The fracture of the left leg was manipulated and immobilised in a plaster stretching to the knee. The arm wounds were treated by débridement, powdered with sulphanilamide, and dressed with paraffin gauze.

Plasma (3 pints) was given intravenously on his return to the ward. On regaining consciousness he was started on an oral course of sulphanilamide (24 grammes). A febrile reaction followed the operation, but this soon subsided to a mild irregular pyrexia compatible with a moderate toxæmia from the sepsis in his wounds. Further X-ray examination showed that the fracture of the left leg had been satisfactorily reduced but that of the right leg was still in poor position.

His general condition remained good though the temperature continued to be slightly raised. His arm wounds were soon clean and granulating and his leg plasters were comfortable. As time went on however the plaster on the right leg became progressively more malodorous owing to soakage with discharge. Finally pus began to escape at the upper end, demanding a change of plaster which was carried out on Sept. 14. At the redressing, the wound was found to be still heavily infected, and it was felt that amputation was probably going to be necessary; but, in view of his satisfactory general state, it was considered safe to persist with conservative treatment for a little longer.

The response to this change of plaster was very alarming; the patient became desperately ill with a high temperature and a rapid feeble pulse. He also began to have rigors and attacks of sweating. At first it was thought that this was a reaction similar to that following his original operation, but more severe, and that it would subside spontaneously. But the rigors continued and it became clear that a systemic infection on a large scale was in progress. A specimen of blood was taken for culture on Sept. 17. Meanwhile he was started on sulphanilamide by mouth again, a preliminary blood examination having shown that he had 12,000 leucocytes per c.mm. On Sept. 19 a report on the blood-culture showed that no growth had been obtained after two days' aerobic incubation. Chemotherapy was continued for several days, but it proved ineffective and on Sept. 22 an urgent amputation of the right leg was performed. The operation was well borne, but the pyrexia and rigors continued unabated. Though no metastatic foci of infection had been located on repeated clinical examinations before operation, there could now be no doubt that such existed. Subsequent treatment of the case amounted essentially to prompt attack on pyæmic abscesses as they appeared.

Further blood-cultures were carried out on Sept. 21 and 25, nutrient broth being again employed and the conditions of culture aerobic. These remained sterile except for a growth of *Staphylococcus aureus* in one culture bottle of the second specimen; this organism had non-pathogenic characters and was regarded as a skin or air-borne contaminant.

On Sept. 29 an abscess developed in the left elbow region. This was opened and found to lie deep to the triceps muscle; it had no evident connexion with the humerus or elbow-joint. Film examination of the pus showed gram-negative bacilli. Culture aerobically on blood-agar produced no growth; but culture anaerobically on serum-agar gave a scanty growth of a gram-negative filamentous organism. A similar abscess made its appearance in the right elbow region on Oct. 2.

DR. SHACKLETON: REFERENCES

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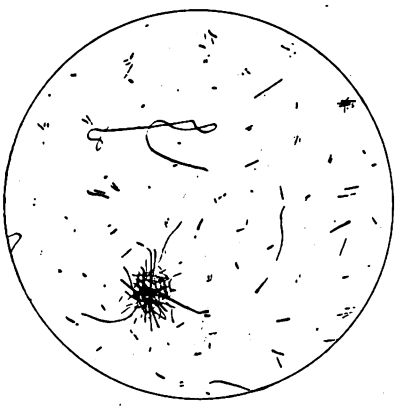
This was drained, and the same organism was demonstrated in stained film and isolated on anaerobic culture.

A consideration of these and subsequent bacteriological findings left no doubt in our minds that the organism isolated from both abscesses was *Bact. necrophorum*. This organism flourishes only under oxygen-free conditions. Blood-culture was therefore repeated on Oct. 4 and 5, on these occasions anaerobically as well as aerobically. From both anaerobic cultures a pure growth of *Bact. necrophorum* was obtained; the aerobic cultures remained sterile as before. That this organism was circulating in the patient's blood-stream was now established and that it was the pathogen responsible for his illness was practically certain.

The patient's general condition gradually deteriorated. On Oct. 28 he began to have pain in the right side of the chest. There were signs of consolidation at the right base, and radiologically an oval shadow was demonstrated in the right lower lobe; this was attributed to a developing abscess. By this time however he was semi-moribund, and he died on Nov. 2. Before death anaerobic blood-culture gave a heavy growth of *Bact. necrophorum* in pure culture. Repeated blood examinations during the illness had shown anæmia of increasing severity, despite numerous blood-transfusions, and a steadily mounting leucocytosis reaching an absolute polymorph count of 53,760 per c.mm. shortly before death.



Bact. necrophorum from blood-culture incubated anaerobically at 37° C. for 48 hours. Stained with dilute carbol fuchsin. (× 350.)

NECROPSY

Both lungs contained multiple pyæmic abscesses; they tended to be subpleural, and the largest and oldest were in the right lower lobe. A fibrino-purulent pleurisy occluded the pleural space on the right side; the left pleural cavity contained about a pint of straw-coloured fluid, and a similar effusion was found in the pericardial sac. There were also metastatic abscesses in the subcutaneous tissues of limbs and buttocks. The amputation stump was infected and the bone exposed. The only pathological changes found elsewhere were those to be expected after a long wasting illness.

Pus from one of the lung abscesses, stained by Gram's method, showed large numbers of *Bact. necrophorum* with a background of degenerate polymorphs and acellular debris. On anaerobic cultivation a heavy growth of this organism, together with an occasional colony of staphylococcus, was obtained. Histological examination disclosed the usual features of a subacute abscess: the central core of necrotic tissue was surrounded by a cellular layer of polymorphs, lymphocytes, macrophage cells and fibroblasts, and this in turn was bounded by a zone of fibrous tissue. In gram-stained sections *Bact. necrophorum* was found lying mainly in the cellular layer. Aggregation of the organisms into tissue colonies consisting of closely interwoven filaments was a striking feature.

ISOLATION AND IDENTIFICATION OF THE ORGANISM

In stained films of pus the organism occurred as a small gram-negative bacillus, with little or no tendency to assume a filamentous form; but in culture, both solid and fluid, this filamentous character was very striking, and threads were observed as long as 50–60 μ with an average width of just under 1 μ. The sides of the filaments were parallel and the ends rounded and tapered. Club-shaped ends were seen rarely and then only in shorter bacillary forms. Coccobacillary, diplobacillary, "beaded" and intermediate forms were frequently seen and this pleomorphism was a constant feature (see figure). Spore-formation, branching and mobility were all absent. With the exception of dilute carbol-fuchsin, either alone or as a counterstain in Gram's method, the ordinary basic aniline dyes were not readily taken up by the organism. It was frankly and invariably gram-negative.

CULTURAL CHARACTERS

(*a*) *In fluid media.*—In nutrient broth to which 4 c.cm. of the patient's blood was added and cultured under anaerobic conditions, a single cream-coloured "fluffy" ball about 3 mm. in diameter was seen at the bottom of the broth-layer after 48–72 hours' incubation at 37° C. The colony was readily broken up and after a further 24 hours the broth had a slightly flocculent turbidity. A few bubbles of gas floated to the surface of the medium when the culture tube was shaken, and a faint foul odour was given off.

(*b*) *In semi-solid media.*—The medium in this case was deep "sloppy" agar to which 4 c.cm. of the patient's blood had been added. Growth was present throughout the medium, but most of the colonies were in the lower half of the tube. One blood sample taken during a rigor and cultured in this way gave a growth of about 50 visible colonies after 48 hours' incubation. The colonies were small (1 mm. in diameter), discrete and dirty white. When 48-hour cultures were examined with a lens they were seen to have fimbriate edges.

(*c*) *On solid media.*—Growth occurred only on agar enriched with blood, serum or hydrocele fluid. After 48 hours' anaerobic incubation at 37° C. the colonies were circular, low convex and about 1 mm. in diameter. They were grey or dirty white, semi-opaque and viscid. The surface was slightly granular and the edge slightly irregular. A zone of β-hæmolysis about 1 mm. radius was present in blood-agar.

Most workers agree that anaerobic incubation at 37° C. and enrichment of the culture medium are necessary for satisfactory growth of *Bact. necrophorum*. However, Beveridge's (1934) observations show that under certain conditions growth may occur in contact with air. Thus he succeeded in growing it aerobically in liquid media when 10% of blood or two drops of *Staph. aureus* culture had been added, and from primary anaerobic culture subcultured it aerobically on solid media. He also seems to have had less difficulty than others in growing it on plain media.

BIOCHEMICAL AND SEROLOGICAL REACTIONS

Fermentation of the more common carbohydrates with production of gas is usual but not invariable. Formation of indole is however a constant character. Our organism gave a strongly positive rosindole reaction in serum peptone water after 48 hours' incubation.

A suspension of the organism was agglutinated by the patient's serum in high dilution, but this finding is inconclusive as agglutination also took place spontaneously in normal saline. This auto-agglutination has been noted by other workers and has proved troublesome when carrying out serological reactions. Five of Beveridge's strains were agglutinated by sodium chloride even in 0·05% solution.

Dragstedt et al. (1941) have demonstrated the presence of specific antibodies for *Bact. necrophorum* in the serum of patients with chronic ulcerative colitis. Nevertheless it seems that only limited value can be attached to serological methods as an aid to identification of the organism and to clinical diagnosis in both veterinary and human medicine.

ANIMAL EXPERIMENT

A guineapig inoculated intraperitoneally with a pure culture of the organism remained unaffected. A rabbit inoculated intraperitoneally with 1 c.cm. of a heavy suspension of the organism appeared in good health for a week, then languished and died 12 days after inoculation. A sero-fibrinous peritonitis was found and the peritoneal cavity contained much cheesy pus. The pus contained a large number of morphological *Bact. necrophorum* and a pure growth of this organism was obtained on anaerobic culture. Although an apparently healthy rabbit was chosen for the test, necropsy showed that the animal had been suffering from hepatic coccidiosis; but we do not think that the experiment is invalidated by this finding.

Discussion

Bact. necrophorum lives as a saprophyte in cultivated soil and manure, especially around farms, stables and abattoirs. Its pathogenic rôle in the group of animal

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diseases known collectively as necrobacillosis has already been mentioned but we should add that it has been repeatedly isolated from the fresh fæces of healthy herbivora. Dragstedt et al. (1941) showed that the colon of healthy humans may also harbour it.

The source of infection in the case recorded above is a matter for conjecture. At no time during the history of the wound was our patient exposed to any obvious extraneous source of infection. He was on a destroyer at sea when the wound was received, and the subsequent treatment was carried out in a station which is virtually isolated from all agricultural activities. No cases of animal necrobacillosis have been reported or suspected among the livestock in this locality. It may be of some interest to note that, before enlistment in the Royal Navy two years previously, the patient was employed as a farm labourer.

The portal of entry of *Bact. necrophorum* was presumably the wound associated with the compound fracture of leg, for the first signs of septicæmia immediately followed the manipulation of the limb. It must be confessed, however, that the presence of the organism in the wound was never proved. Attempts to isolate and investigate gram-negative bacilli seen in stained film of the wound swab were abandoned because of the abundant and varied bacterial flora presented in film and culture. Moreover, the wound showed none of the excessive necrosis found in animal infections with *Bact. necrophorum*. In view of the close bacteriological relationship between this organism and *Bacteröides funduliformis* it should be mentioned that septicæmia due to the latter is almost invariably post-anginal (Lemierre 1936). At no time immediately before or during his illness did our patient suffer from a sore throat.

Summary

During a naval engagement a man aged 24 sustained an open fracture of the leg and various minor wounds. After a month the fracture wound was still heavily infected and signs of septicæmia developed. Chemotherapy was ineffective and the leg was amputated. Aerobic blood-culture was negative, but a gram-negative filamentous organism resembling *Bact. necrophorum* was isolated from pyæmic abscesses and was later grown anaerobically from the blood. On the patient's death, after nearly 12 weeks' illness, multiple pyæmic abscesses were found in the lungs and under the skin.

Bact. necrophorum is widely distributed and causes a variety of animal diseases. Though it has been recovered from the healthy human colon and also from the colon in ulcerative colitis, very few cases are on record in which it has been clearly pathogenic to man. In this particular case the source of the infection is unknown.

We wish to thank Colonel W. A. Jackman, TD, for permission to publish this paper and Major D. P. King, RAMC, for much helpful criticism and advice.

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CORRIGENDUM.—In a report last week (p. 373) of Mr. R. A. Brews's remarks at a meeting of the Association of Industrial Medical Officers, the fourth sentence should read: Women are conditioned to expect minor mental and physical disorders in association with *menstruation* . . .

PATHOGENESIS OF SULPHONAMIDE NEUTROPENIA

R. G. PARK, MB NZ, MRCP
MAJOR NZ MEDICAL CORPS
From a military hospital in the Middle East

NEUTROPENIA, culminating in agranulocytosis, is now recognised as a common and perhaps the most dangerous complication of sulphonamide therapy. This paper attempts to examine the mechanisms by which it is produced and to formulate suitable precautions.

AGRANULOCYTOSIS AS AN ALLERGIC REACTION

Schilling (1929) pointed out that one of the features of anaphylactic shock in animals is a profound fall in the leucocyte count.

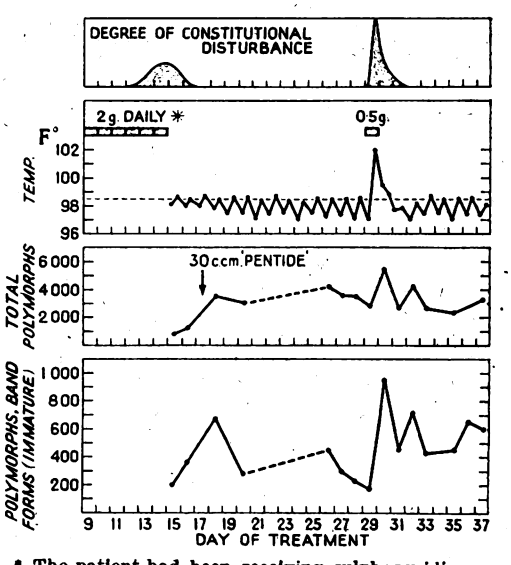
Neutropenic states have been produced by administration of benzene (Kracke 1932) and other drugs with a benzene ring in their structure—e.g., amidopyrine, arsphenamine. Sulphonamides fall into this group of drugs. Madison and Squier (1934) observed that agranulocytosis, first described about 1922, has appeared only since these drugs have come into general use. They quote 3 cases due to amidopyrine in which small repeat doses caused the neutropenia to recur immediately, and concluded that this condition is a manifestation of drug allergy. Kracke (1938) pointed out that the disorder occurred only in susceptible people, and that in these it was specific—i.e., was elicited only by amidopyrine and its closest chemical relatives. Reviewing recent cases attributed to sulphanilamide, he argued that since they developed only after large doses they were possibly of different pathogenesis.

The following case indicates that sulphapyridine can give rise to neutropenia by the same allergic processes as amidopyrine.

CASE-HISTORY

The patient was an aircraftman aged 22, who gave no family or personal history of asthma, hay-fever, eczema, serum reactions or drug idiosyncrasies, but had suffered from one previous isolated attack of urticaria, which was put down to fruit. He was first seen with molluscum contagiosum of the chest and axilla. The lesions were destroyed individually, but new ones kept appearing, and eventually sulphapyridine was tried in the doses recommended by Hill and Downing (1942). This had no effect on his skin disease, but led to the following constitutional reactions.

EFFECTS OF SULPHAPYRIDINE: RESPONSE TO PENTIDE *



* The patient had been receiving sulphapyridine 2 g. daily for the preceding 8 days.

He was given one tablet four times a day, a daily dose of 2 grammes. He reported on the 8th day feeling perfectly well and was given a further week's supply at the same dosage. At about the 12th day he began to feel slightly ill and developed a headache. He completed the course of sulphapyridine and reported on the 15th day, complaining of malaise, headache and itching of the face. A leucocyte count showed under 1000 neutrophils per c.mm. (see figure).

He was admitted to hospital, sulphapyridine stopped and 30 c.cm. of sodium pentosenucleotide ('Pentide') given. His

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cervical glands were enlarged and tender. In the region of the left shoulder was an area of petechial hæmorrhages. The capillary resistance test was mildly positive, and platelet count and bleeding time both normal. Symptoms subsided in about 48 hours and the leucocytes rapidly returned to normal.

On the 29th day, when the leucocyte count had become steady, one 0·5 g. tablet of sulphapyridine was added to his regular thrice-daily medicine without his being aware of it. Symptoms began suddenly two hours later. These consisted of the same malaise, headache and itching of the face previously experienced, with fever up to 102° F., flushed face and bloodshot eyes. In a few hours he felt better and he slept well that night. Examined next morning, he was still flushed in the face, with congested conjunctivæ, a faint scarlatiniform erythema on the trunk and a temperature of 99·5° F. The neutrophil count showed a sharp rise from 2800 to 5400 per c.mm., the immature forms of which rose from 180 to 940. The constitutional reaction subsided in about 48 hours, and the leucocytes rapidly returned to their former levels. In view of this sharp hypersensitivity with a potentially dangerous type of reaction, it seemed unsafe to pursue the investigation with doses of other sulphonamide drugs.

Three months later he was admitted to hospital for further investigation. The leucocyte count was 6300 (polymorphs 66%, band forms 5% and adult forms 61%, lymphocytes 29%). He was given one-eighth of a gramme of sulphapyridine by mouth, and two hours later developed a reaction of the same type, with a temperature of 99·5° F. The following course of desensitisation was then given:

1st and 2nd days	2 doses of 0·1 g.			6th day ..	..	4 doses of 0·5 g.	
3rd day	3 ,,	0·1 g.		7th ,, ..	..	5 ,,	0·5 g.
4th ,,	3 ,,	0·2 g.		8th and 9th days		5 ,,	1·0 g.
5th ,,	3 ,,	0·4 g.					

At no stage was there the least febrile or other reaction, and the leucocyte count on the final day was 7500 (polymorphs 75%, band forms 5% and adult forms 65%, lymphocytes 26%).

DEFINITION OF ALLERGY

The term allergy was introduced by Pirquet in 1906 to describe the alteration in sensitivity in a tissue as a result of exposure to a specific substance, so that upon re-exposure to the same substance it shows a difference in sensitivity—either an increase or a decrease.

The criteria of an allergic disorder have been summarised by Sulzberger (1940) as follows:

It must be the expression of an abnormal sensitivity which is both *specific* and *acquired*. There are certain typical stages by which an allergic state develops, whether the allergen is a living organism, a foreign protein, or a relatively simple chemical substance. Initial exposure to the allergen elicits no reaction in the tissues. After a varying incubation period—usually between about 6 and 20 days—a change occurs in tissue sensitivity. Should the allergen still be in the body—e.g., multiplying organisms, foreign sera, drugs continuously administered—there is seen the reaction known as "the spontaneous flare-up." And from that time onwards, re-exposure will immediately elicit this changed reaction, with *no* incubation period.

The case reported here illustrates these stages. At first sulphapyridine caused no ill effects. After an incubation period of 12 days, this insensitivity gradually passed off, as shown by the slow onset of symptoms and changes in the neutrophils. The drug was stopped and the reaction subsided, but the altered sensitivity continued to rise, so that on the 29th day a very small exposure to sulphapyridine caused a sharp reaction in the bone-marrow and other tissues. The subjective symptoms were the same as those experienced in the spontaneous flare-up, but considerably more intense, even with a considerably lower blood-concentration of the drug. True, the spontaneous flare-up caused leucopenia and the re-exposure leucocytosis, but possibly these were marrow reactions of similar nature but of varying degree. Leucocytosis is seen in other states of marrow depression as an early attempt at compensation, and had further sulphapyridine been given in this case, leucopenia might have followed.

Three months after this a second re-exposure caused a similar reaction, and desensitisation was then achieved by means of ascending doses.

PREVIOUSLY REPORTED CASES

The table gives essential details of 20 cases published by other workers.

Year	Author	Days' chemotherapy	Total dose (g.)	Av. daily dose (g.)	Day of onset of reaction (approx.)
1938	Coxton and Forbes	17	54	3·2	..
1938	Johnston*	24	58	2·4	..
1939	Corr and Root ..	15	35	2·3	10
1939	Rosenthal and Vogel	16	95	6·0	17
1939	Pearson ..	14	31	2·2	14
		23	35	1·5	29
1939	Gayus et al. ..	17	40	2·4	17
1939	Sutherland ..	14	52	3·7	12
1939	Barnett et al. ..	17	81	4·8	..
1939	Nicol and Freedman	21	68	3·2	27
1939	Tzank et al. ..	15	18	1·2	..
1939	Briggs ..	9	60	6·4	9
		9	42	4·7	9
1940	Leftwich	21	42	2·0	24

*Average in 7 cases.

It is commonly held that the danger of agranulocytosis is proportional to the total dosage of the drug given. This is true in a sense, but only because large doses often take a long time to give; and a striking feature of the 20 cases in the table is the *small* average daily doses (2·3 g.). Clearly these patients could not have had nearly so large an amount of drug in the body at any one time as the many thousands of patients given much larger daily doses for shorter periods, in whom agranulocytosis has not been reported. The total dosage in one of these cases (18 g.) was considerably less even than that given as a safe routine in practice.

The figures bear out Pearson's (1939) hypothesis that the patients were given small doses over longer periods than is customary; in no case did the condition arise in less than 9 days.

Some of the published reports give information about the height of sensitivity at different times. The two earliest cases (9 days) were reported by Briggs; in these the first sign of the disorder was a "toxic" eruption, and then blood-counts showed leucopenia. The drug was stopped and both patients felt quite well throughout the episode. Here there is evidence of a mild degree of hypersensitivity, with altered blood findings but no symptoms. At a slightly later stage—for example, during the spontaneous flare-up in my own case on the 12th day—there is a rather higher sensitivity, with mild symptoms and pronounced blood changes. At still later stages there is evidence of extreme sensitivity. My case was very hypersensitive by the 29th day, whereas in two of the quoted cases the drug was stopped on the 21st and 23rd days, agranulocytosis became apparent 6 days later, and was severe enough to cause death.

The phenomenon of an immediate reaction on re-exposure to sulphonamides has also been noted before. A baby described by Rosenthal and Vogel (1939) reacted fatally to a dose of 1·25 g. three weeks after a previous course of sulphapyridine. Shirley and Allday (1940) report a case in a woman who took several tablets left over from those prescribed for a previous attack of sore throat. These re-exposures are the only reported cases of neutropenia developing before the elapse of a typical allergic incubation period.

ALTERNATIVE THEORIES

We have seen that the two essentials of an allergic hypersensitivity are that it should be both acquired and specific. Sulphonamide neutropenia is acquired, since it only appears after an incubation period of at least a week. These drugs are so rapidly excreted that in order to maintain an adequate blood concentration they must be given in frequent doses totalling at least 6 g. a day; thus accumulation could not possibly have occurred in these cases; and moreover, reactions have followed small doses long after all traces of the drug must have been eliminated.

It seems likely that the condition is also specific. No cases have been recorded of sulphonamides sensitising patients to other drugs capable of causing neutropenia.

Lastly, it might be argued that though some cases are clearly allergic, others may be primarily toxic. The allergic effects of drugs are recognised as being entirely

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distinct from their toxic actions; these tend to be characteristic of each individual drug, whereas allergic effects are common to a number of drugs, and their character depends on the site of the reacting tissue. Thus the leucopoietic marrow reacts in an identical fashion to sensitisation by sulphonamides, amidopyrine, arsphenamine and other benzene compounds.

In the cases quoted other tissues besides the bone-marrow have shared in the allergic response, including the heat-regulating mechanisms (drug fever), the lymphatic glands (enlargement), and the blood-vessels (vasodilatation in the skin and conjunctivæ, exanthematous eruptions and purpura). Many of the so-called "toxic" effects of sulphonamides, especially eruptions and fever, appear characteristically after an incubation of a week or more, and investigation of these might reveal that they too are allergic.

CONCLUSIONS

In some people the administration of sulphonamides for more than about a week induces a dangerous form of drug allergy. As a working rule chemotherapy should not be prolonged beyond this period; since most amenable infections respond in a few days, longer administration is seldom necessary.

Sensitivity develops gradually, the first signs being a depression of neutrophils in the blood. It steadily rises, and the next effects are such constitutional symptoms as malaise and headache, which may go unnoticed in a patient already ill from an acute infection. Finally the neutrophils disappear completely from the blood, and the alarming syndrome of agranulocytosis appears, often suddenly supervening upon hitherto mild symptoms. If the drug has been given up to this stage, or even several days short of it, the prognosis is grave. In the few cases, therefore, where it is considered necessary to give sulphonamides for over a week, however small the amounts, daily leucocyte counts should be done, and at the first sign of neutropenia the drug should be stopped and its elimination encouraged by promoting diuresis.

It cannot at present be indicated how long this allergic state lasts. In a report on sulphonamide sunlight eruptions, Platts and I (1942) observed that these rashes typically came on after 8–10 days' therapy and that some patients received subsequent courses with no recurrence of their eruptions. If this was an allergic reaction it had disappeared in the course of a few weeks; and sensitivity of the bone-marrow may also be short-lived. The occurrence of these delayed eruptions in cases of neutropenia suggests that they are a closely related form of allergy. Until this point is cleared up, however, a reasonable precaution in any victim of neutropenia requiring sulphonamide later would be to give it in ascending doses with extreme caution.

SUMMARY

A case is reported where neutropenia from sulphapyridine was clearly due to drug allergy. After three months' observation the patient was desensitised.

From an examination of reported cases and by analogy with neutropenia from other drugs, it seems probable that all such cases are allergic responses. Other toxic effects of sulphonamides are probably of the same nature.

I wish to thank Captain C. P. Powles and his laboratory staff for their help in the blood-counts in the case reported, and the Director of Medical Services, NZEF, for permission to publish this paper.

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Medical Societies

ROYAL SOCIETY OF MEDICINE

ON March 14 the section of experimental medicine, with Dr. R. D. LAWRENCE in the chair, discussed the

Ætiology of Jaundice

including infective hepatitis, homologous serum jaundice, arsenotherapy jaundice, and the type which follows vaccination.

Dr. F. O. MACCALLUM reviewed the attempts to isolate a causative agent from cases of infective hepatitis and homologous serum jaundice by inoculation into various animals and man. A large number of experiments have been carried out in the different countries where infective hepatitis is prevalent, but only two groups of workers have claimed positive results. From Denmark Andersen and Tulinius reported transmission of the human disease by feeding duodenal juice from cases of infective hepatitis to young pigs on a quantitatively deficient diet. Liver changes were said to have been produced within 2–4 days of the feeding experiment. The value of these experiments is rather doubtful as there was an epizoötic of hepatitis among the swine in Denmark at that time. The other positive transmissions were claimed by three groups of workers in Leipzig. It was said that inoculation of duodenal washings from cases of hepatitis in the pre-icteric stage on to the chorioallantoic membrane of developing chick embryos had resulted in the death of the embryos after 4–5 days, and that the toxic agent had been transmitted for 8 passages in the embryo. Negative results were obtained by inoculation of urine and blood from cases of infective hepatitis. The Leipzig workers had also reported infection and death of canaries inoculated with duodenal juice or urine. Symptoms appeared in the canaries about the 3rd day after inoculation, with death on the 4th or 5th day. Canaries inoculated with blood from cases of infective hepatitis remained well. In the present study being carried out at Cambridge for the Medical Research Council all attempts to repeat the results in pigs and canaries had so far been unsuccessful. Microscopic liver changes as described by Andersen had been seen in the control animals on the deficient diet at Cambridge. The human transmission experiments suggested that the causative agent of infective hepatitis was present in the duodenal juice and blood of patients before jaundice appeared and in the blood 2 days after jaundice had appeared. The results of animal experiments with material from cases of homologous serum jaundice and pools of human serum known to be icterogenic had been entirely negative. Experiments in human volunteers had shown that the icterogenic agent was present in the blood of a presumed case of homologous serum jaundice 7 days after the appearance of the jaundice but not 66 days later. It had also been proved that a batch of supposedly normal human serum made from a pool from a number of blood-transfusion depots had contained an icterogenic agent which was responsible for the jaundice produced by a batch of yellow fever vaccine containing that serum.

Dr. A. M. MCFARLAN described some features of an outbreak of hepatitis in British Army recruits after intravenous inoculations of mumps convalescent plasma, studied by the American Red Cross Harvard Unit. A clinical comparison of 49 cases with 37 cases of infective hepatitis showed that vomiting was less frequent, and rashes and arthralgia were more frequent, in the plasma jaundice cases. Epidemiologically the outbreak was unlike infective hepatitis in the long interval between inoculation and development of symptoms (60–90 days in 87% of cases), the absence of a secondary batch of cases in uninoculated men, and the occurrence of jaundice in 8 of 11 inoculated men who gave a history of jaundice in childhood. It was clear that certain batches of human plasma or serum were icterogenic, but statements that jaundice had been caused by transfusion with whole blood were less well founded. Reports of such cases should record the results of a search for cases of hepatitis in contacts, and the source of the suspected blood or blood product.

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Major JAMES MARSHALL said that the hepatitis which developed about 9 days after the beginning of arsenotherapy for syphilis was due to the arsenic and was more frequent in patients receiving intensive therapy. The incidence had been higher in a series of cases reported from the Royal Navy than in an American series, perhaps because the American diet contained more liver-protective substances. The hepatitis which developed 12–17 weeks after the beginning of treatment was not due to a recurrence of syphilis. Arsenic played some part, but was not the prime factor. The incidence of jaundice was lowered if the dose of arsenic was reduced but not by the use of arsphenoxide in place of NAB. No particular batches of the drug were associated with a high incidence. The increased incidence of arsenotherapy jaundice was noted in districts south and south-west of London in 1941, in London itself in 1942, and in Essex in late 1942 and 1943. The incidence in various clinics ranged from 20 to 50%; it was higher in Army clinics than in RAF and civilian clinics. Officers and other ranks were affected equally, whereas in peacetime private patients had practically never been affected. In women in Service clinics the incidence was only 5%. Experiments carried out with Prof. John Beattie had shown that the administration of methionine or of cystine alone or with a papain digest of casein delayed the onset of hepatitis so that 20 injections of arsenic could be given instead of 11. This was of great importance in treating syphilis. Major Marshall suggested that an icterogenic agent was transferred by the syringes used for arsenical inoculations. Of 6 cases treated with individual sterilised syringes none had developed jaundice within 100 days of the first inoculation. There was an incidence of jaundice of 50% in patients treated at the same clinic with the usual syringe technique. In individual cases the interval between the first inoculation with a possibility of infection and the development of symptoms had been 80 days. Cases of arsenotherapy jaundice had apparently been infected in hospital by patients with infective hepatitis, which suggested that the "100-day jaundice" of arsenotherapy was distinct from the "30-day jaundice" of infective hepatitis. In treatment he recommended a high protein and high carbohydrate diet including 2 pints of dried or fresh milk and 1 dried or fresh egg daily.

Lieut.-Colonel T. BADGER (USA) reported on 1300 cases of yellow fever vaccine jaundice seen in his hospital. The clinical picture was similar to that described by others and differed little from ordinary infective hepatitis except that none of his patients had any fever. There was no evidence of any contact infection in groups of individuals who had not received the suspected vaccine but were exposed to the cases of jaundice. The interval between inoculation of vaccine and appearance of jaundice varied from 12 to 18 weeks and this period was similar for groups inoculated with different batches of vaccine. Laboratory experiments showed that the disease was not a form of yellow fever, and the evidence suggested that the supposedly normal human serum used for making the vaccine contained the responsible icterogenic agent.

Major M. H. SALAMAN described experiments made to see if the recent increase in arsenotherapy jaundice was due to faulty technique in sterilisation of syringes. It had been suggested that using the methods generally practised blood might be transferred from a patient incubating hepatitis to other patients in the clinic. Of 29 syphilitic patients who received arsenical injections with individual heat-sterilised syringes and special precautions to ensure sterility, only 1 developed jaundice within four months of the first injection. In contrast, jaundice developed in 40% of patients (25 out of 67) receiving inoculations with the usual technique. When the follow-up was extended to six months, only 1 of 12 patients treated with individual syringes developed jaundice, as compared with 38 of 56 patients treated by the usual technique. He doubted whether boiling syringes between inoculations was a sufficient safeguard, and recommended the use of individual heat-sterilised syringes and scrupulous attention to the details of technique.

Dr. N. F. MACLAGAN said that the colloidal gold test showed differences between obstructive jaundice, where almost all sera were negative, and infective hepatitis, where almost all were positive. In arsenotherapy jaundice sera were less often positive. Hanger had noted a low percentage of positives in the cephalin cholesterol flocculation test applied to arsenotherapy jaundice cases. These biochemical findings indicated some difference between arsenotherapy jaundice and infective hepatitis.

Dr. J. F. LOUTIT said that an icterogenic batch of pooled serum had produced jaundice in 10 of 17 persons who received transfusions of quantities up to 1200 c.cm. There had been an equally high incidence of jaundice in persons who received intradermal injections of 0·1 c.cm. Homologous serum jaundice might therefore result from very small amounts of serum, which was an argument in favour of the syringe transmission of arsenotherapy jaundice.

Sir HENRY TIDY recalled that when "catarrhal jaundice" was prevalent in 1928 it was noted that the disease was more severe in older patients. Jaundice had become a common complication of glandular fever (infectious mononucleosis) only in 1935. It was also a complication of other infectious diseases. He thought that the kidneys might be affected as well as the liver, and that the parenteral portal of entry in homologous serum jaundice as compared with the respiratory portal in infective hepatitis would account for the observed differences in infectivity.

Reviews of Books

Diseases of the Gastro-Intestinal Tract

ASHER WINKELSTEIN, MD, associate in medicine and physician in charge of the gastro-intestinal clinic Mount Sinai Hospital, New York. (Oxford University Press. Pp. 195. 12*s.* 6*d.*)

A BOOK of 195 pages on gastro-intestinal diseases could give a useful summary of the ætiology, pathology, symptoms, diagnosis and treatment, useful alike for keen senior students, general practitioners and consulting physicians and surgeons, though hardly for specialists in gastro-enterology; and to hold their attention it should be well written, and present the facts in an interesting way. Dr. Winkelstein is a learned gastro-enterologist with an original mind, but his book consists of terse statements divided into ten chapters, each with 2–13 numbered subheadings, further subdivided until the smallest sections are single sentences. For those who like to have their mental food offered in the form of iron rations the method can be recommended; the book certainly contains the essential facts of gastro-enterology with few errors or omissions.

State of Medicine in Ireland

W. R. F. COLLIS, MD CAMB., FRCP, FRCPI, physician to the National Children's Hospital, Dublin. (Parkside Press. Pp. 70. 2*s.* 6*d.*)

AT his death in 1849, Richard Carmichael, a distinguished Dublin surgeon, bequeathed to the Royal College of Surgeons in Ireland a sum of £3000 to endow prizes for essays dealing with medical education and with the condition of the medical profession. The prize was awarded in 1943 to Dr. Collis for a compact and careful study, whose value lies, not so much in its facts, which are not always exact, as in its constructive spirit. Dr. Collis covers the several branches of medical work, and has criticisms and suggestions to make on nearly all. He has special qualifications for a task of this kind: Irish by birth, he was educated at Cambridge, and spent some years in specialist professional work in London before settling in Dublin. He therefore sees freshly. To those well accustomed to present conditions some of his suggestions may appear impracticable, while in those who have traditional rights they may rouse resentment. He recommends the establishment of a National Board of Health, to combine the Ministry of Health, the National Health Insurance Society and the dispensary system—in fact all the official side of medicine. He recognises the practical value of the clinical education given in Irish medical schools, but emphasises the lack of training and opportunity for scientific investigation. His suggestions might redress the balance between these two types of medical education. His criticisms are generally well based, and his positive suggestions sound, but he may have underestimated the strength of custom and the prejudice in favour of established ways.

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THE LANCET

LONDON: SATURDAY, MARCH 25, 1944

YE FEARFUL SAINTS

EVEN those who regard the Minister of Health as a disguised wolf will hardly deny that his sheep's clothing is an admirable fit. In last week's parliamentary debates he and his ministerial colleagues showed apparent understanding of the doubts and fears aroused in the medical profession by their proposals for a National Health Service. In different words he seemed to endorse Lord DAWSON's dictum that 'there is only one way in which it is possible to administer a large profession with all its technicalities, and that is to put at the right hand of every administrative body a vocational body "—with real power—"to advise and guide its policy." He made it plain that his Ministry favours experiment with various types of health centre, rather than one type alone. And he corrected the misapprehension that the Central Medical Board will have the right to direct young practitioners into the public service: for all that was meant by the white-paper's ambiguous sentence was that the young entrant may be debarred from part-time practice if he chooses to settle in an under-doctored area. Mr. WILLINK might have gone on to point out that the best use of medical resources is impossible unless they are planned, and that planning is useless unless somebody has enough power to make the plan work. Hitherto the distribution of doctors has been governed chiefly by effective demand—the demand of people who can pay. In the crude American phrase, "doctors will go where folks have the dough." The result, as Mr. JOHNSTON told the Commons, is that a place like Hastings, before the war, had one general practitioner for every 1178 inhabitants, while South Shields had one for every 4105. The Government suggest that in the public service new practices shall not be established, or vacant practices filled, in over-doctored areas—an inhibition designed to increase the number of doctor's settling in districts where they are needed more. It seems to us entirely reasonable that those in charge of a National Health Service should be able to exercise this power of "negative pressure" (as Lord MORAN aptly called it); though we think it may also be wise to attract practitioners positively to unpleasant districts by offering them special remuneration or amenities. "A certain amount of organisation" as Mr. WILLINK said "is essential."

To this he added: "we must do everything to see that organisation spells neither bureaucracy nor red tape." In the same debate Mr. ALEXANDER WALKDEN, as an old trade-unionist, begged the profession not to frighten itself with words like regimentation and bureaucracy.

> "A bureau is only an office. The man in charge is, in French, a bureaucrat. We should call him a clerk in English. As for 'regimentation,' as applied to any civilian occupation, it seems, like 'bureaucracy,' only a bogy word. . . . We get plenty of regimentation in industry. . . . When necessary, we can fight it. I am sure doctors can do so too."

As doctors we share Mr. WALKDEN's disrespect for offices and clerks; but cannot, alas, dismiss so lightly their capacity to interfere with medical work. In dealing with red tape the important thing is not so much to fight it as to defeat it, and go on defeating it; and, like certain other battles, this one perhaps had better not start until the profession can be reasonably sure of victory. Lord DAWSON expressed a very general concern when he spoke of the insidious influence of an able Civil Service:—

> "Over and over again you see something which began by being independent being slowly drawn, year by year, within the spider's web. . . . It will be easy enough to start with an independent service, but I am not sure that it will be able to remain independent; and once you get medicine and its science and art under the control of the Civil Service, goodbye to the best that medicine can do!"

In a thoughtful speech welcoming the white-paper from the Labour side, Dr. MORGAN was equally emphatic:—

> "Doctors are afraid, and truly afraid, of bureaucrats, especially medical bureaucrats. It may be a delusion on their part and an obsession, but when they look at the medical services that exist they have grounds for their misgivings. . . . In all the services run by the Government there seems to be a blight to keep the doctors down and keep them from developing that initiative which they want to develop."

This is an over-statement, but we concur in Flight-Lieutenant RAIKES's prophecy that men who have been in the Services for four or five years will not want to "jump into complete Government control for the rest of their lives." On the other hand we do not for one moment believe that the white-paper scheme necessitates "complete Government control" or the triumph of bureaucracy over medicine. In a later issue we shall have something to say about the proposed constitution of the Central Medical Board and of the advisory committees, and shall return to the vital question of the clinician's independence of administrators. Undoubtedly modifications of the present scheme are necessary if the profession is to be happy and reach its full potential. But such modifications, in point of fact, appear to be feasible. The attitude of Ministers gives us every reason to think that negotiation can produce a service answering Lord DAWSON's demand—"it must be free-minded, it must be flexible, and it must be professionally guided, because we want to preserve our great profession and to hand down its freedom and its great traditions to the generations which follow us."

The debates yielded valuable comments, and in the Lords maintained a high level of constructive criticism. If it is true, however, that the comprehensive medical service was long ago conceived by our profession, a little more cheerfulness about its evident viability might not have been out of place in the Upper Chamber. In the House of Commons Dr. HOWITT said that the great majority of doctors welcome the appearance of the white-paper, and Dr. HADEN GUEST appealed, as we do, to the profession "to put themselves, not behind every detail, but behind the spirit of these new proposals." Mr. WALKDEN summed up the situation by quoting Mr. EDEN's recent invocation to critics of the Education Bill:—

> Ye fearful saints, fresh courage take.
> The clouds ye so much dread
> Are big with mercy and shall break
> In blessings on your head.

So let us go forward with care, but also with con-

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fidence and good hope. The new arrangements are capable of bringing into medicine more satisfaction and success.

DESENSITISATION TO SULPHONAMIDES

THE treatment of acquired sulphonamide sensitivity is carried a step further by PARK'S account in this issue of successful desensitisation in a case of sulphonamide agranulocytosis. This case fulfilled all the criteria of an acquired allergic state and the desensitisation was carried out by giving increasing doses of the sulphonamide, beginning with 0·1 g. and working up to 1 g. in nine days. The agranulocytosis developed precisely as it does after amidopyrin, and there can be no doubt that the process is similar. Why the granulocytes disappear is not clear. The two popular explanations are a rapid sequestration of the granulocytes in the capillaries of the lung, liver or spleen, or an arrest of their development, usually at the myeloblast stage [1]; the former fits in with the swiftness of allergic states and the latter with the more ingravescent toxic changes.

Skin-sensitivity to sulphonamides has come in for much attention lately; it is being encountered not only when sulphonamides are given internally but also when they are applied externally for the treatment of skin disease, and there is evidence that once sensitivity is produced by external application it may reappear months afterwards if the same or another sulphonamide is given internally.[2] In these circumstances desensitisation becomes an important practical measure, and it is instructive to note that TATE and KLORFAJN [3] found that the usual technique would not work; with a minute dose (gr. 1/250) the eruption reappeared. ERSKINE [4] had already reported that by continuing to give the sulphonamide in the same or slightly reduced doses for 48 hours the skin-sensitive patient could be desensitised; he distinguished between toxic cases due to drug retention and true allergic reactions appearing about the eighth day of treatment; he used Werner's *p*-dimethylaminobenzaldehyde test to determine the excretion of sulphonamide and distinguish between the two groups, and points out that the drug can be safely continued in the face of sensitivity symptoms only in the allergic group. But instances of inadequate sulphonamide excretion are unusual if proper precautions are taken to keep up fluid intake, and without checking the point TATE and KLORFAJN successfully desensitised some of their worst cases of sulphonamide rashes by continuing sulphonamide treatment in spite of further reactions in the skin; the result for the patient was temporarily severe and distressing, but the lesion subsided fairly soon, and the patient then had a negative patch-test. The same principle has been applied to sulphadiazine agranulocytosis by NIXON, ECKERT and HOLMES.[5] Their patients were being treated for virus pneumonia with secondary infection; the pneumonia was still present when the agranulocytosis appeared and was judged by these physicians to be threatening the patient's life at least as much as the agranulocytosis. They therefore persisted with the sulphadiazine, even increasing the dose; to their surprise, after a few days granulocytes appeared again in the blood-stream and the count increased steadily, reaching quite high levels. The patients recovered, though two of them were given so much sulphadiazine that they developed a hæmolytic anæmia, needing blood-transfusion in one patient who had been given 290 g. in fifteen days. Such acute emergencies must be rare, and one does not know which to admire most—the therapeutic courage of the physicians or the constitutional toughness of the members of the United States Army Air Corps who survived the ordeal. Nevertheless here is another example of the technique of continuing with the sensitising sulphonamide in spite of symptoms, and its success in securing disappearance of the lesion and subsequent desensitisation. The technique is not for general use and is perhaps not free from danger—it can only be attempted when full facilities for dealing with the unexpected are available—but it is likely to be repeated and the results will be worth watching.

The explanation is not easy. Another drug reaction that has been treated in this way is iodism; there doubling the dose has often been curative, but the symptoms of iodism are hardly allergic. How far, then, are the symptoms produced by sulphonamides and relieved by continued dosage truly allergic? Experience with food sensitivity teaches that desensitisation is often difficult and symptoms are liable to recur with each exposure; the same is true of most allergic drug reactions such as the particularly dangerous ones due to aspirin or the agranulocytosis following amidopyrin. It would be a bold physician and a brave patient who would chance the consequences of continued administration in cases of aspirin or amidopyrin sensitivity. Sulphonamide sensitivity may well be quite different. The fact that the patients desensitised by NIXON and his colleagues recovered from their agranulocytosis while developing toxic anæmia shows a dissociation between the symptoms treatable by continued dosage and those known to be toxic. All this suggests that the symptoms of drug sensitivity can be sorted into allergic, toxic and "iodism" types, and that only the last will respond to perseverance.

1. *Lancet*, 1941, i, 454.
2. *Ibid*, 1944, i, 55.
3. Tate, B. C. and Klorfajn, I. *Ibid*, p. 39.
4. Erskine, D. *Ibid*, 1942, ii, 568.
5. Nixon, N., Eckert, J. F. and Holmes, K. B. *Amer. J. med. Sci.* 1943, **206**, 713.

THE CHALLENGE OF RHEUMATISM

DEMOCRACY of the British pattern moves with the slowness and cohesion of treacle, and talk is needed to mobilise the desire for any new line of action. Dr. PHILIP ELLMAN [1] in a comparison of tuberculosis and rheumatism points out how much, from the patient's point of view, these two groups of diseases have in common. Both disable the patient for work and expose him to the economic trials of unemployment; no specific treatment has so far been found for either; and both may go on for years. Yet rheumatism, though more widespread than tuberculosis, has received much less serious consideration doubtless because it does not seem to be infectious, and carries no threat to life. The *Practitioner* does well to devote a large part of its January number to a symposium on the subject, for the reorganisation of hospitals is round the next corner, and now is the time to secure the facilities for treatment that rheumatic patients need. Lord HORDER iterates the familiar facts: that the number of sufferers in

1. *Postgrad. med. J.* January, 1944, p. 4.

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the country is immense, perhaps a million all told; that the economic loss (£25,000,000 in England and Wales) entailed by their disability ought to stir those who can shut their ears to the humanitarian appeal; that early and continued treatment, undramatic and empirical though it is, can relieve pain, preserve the usefulness of limbs, prevent and even alleviate crippling. No physician who has kept his rheumatoid arthritic patients in hospital for three months and has seriously tried, even with quite simple methods, to improve their joints and their outlook, will doubt that the effort has been worth while; yet those are usually patients with moderately advanced disease, in whom earlier treatment might have produced much better results. Dr. F. J. BACH outlines this early treatment: it is based on the view that the disease process in most patients runs an active course of some months or years and then becomes quiescent. Rest of body, rest of mind, and good nutrition will reinforce that indefinable but real resistance which the patient offers to the attack of the unknown damaging agent. Good food is not so difficult to come by; rest of mind is harder. The patient's economic circumstances must be inquired into, those dependent on him must be provided for while he is disabled, and the goal of returning to work—either his former job or something more suitable—must be kept constantly before him.

Rest of body does not entail lying like a log in bed. It must be combined with sufficient exercise to preserve the range of movement of joints and hinder the wasting of muscles. Apart from ordering heat to be applied in one form or another, and correcting established deformity, the doctor must decide for every affected joint how much rest it needs and in what position, how much activity and of what kind. Most patients are the better for an initial stay in hospital, where their condition can be assessed, focal or general infections excluded, and treatment begun. For some it must run into months, but many can soon go home and carry on there, wearing splints, taking hot baths, and carrying out, under supervision, a programme of rest and exercises.

Dr. J. L. HALLIDAY restates his theory that rheumatoid arthritis is a psychosomatic disorder, found in people of a certain recognisable psychological make-up. They are emotionally reticent and bottled up, they have a high or an exaggerated sense of duty, and are often obsessional; some of them develop arthritis after an emotional disturbance or period of strain. An analogous explanation of the pathogenesis of duodenal ulcer is today widely accepted, but if this is true of rheumatoid arthritis the evidence has not yet been marshalled wholly convincingly. Whatever part the psyche may play in the causation of the disease, there can be no doubt of its importance in the treatment. The patient's will to recover must be reinforced by every doctor, nurse, and physiotherapist who has to deal with him; they must continually show their personal interest in him, and surround him with a hopeful and encouraging atmosphere.

We may hope that the Government will shortly provide treatment on a nation-wide scale for patients with the rheumatic diseases. Lord HORDER, like most others who have tried to plan it, asks for specialised treatment centres and local treatment centres. The former he thinks should be regional. They might well be within the key or teaching hospitals, for the rheumatic physician's mind like the rheumatic patient's joint needs exercise, which is to be had only in daily argument with his colleagues. These central units should be responsible for initial investigation and diagnosis, but they cannot be large enough to provide even inpatient treatment for every patient needing it. Each should be linked with a large group of beds in a country hospital, where patients can be kept as long as need be, in good surroundings equipped for physiotherapy and reablement. The local treatment centres are intended to provide massage, remedial exercises, and simple heat and electrical treatment for outpatients only. Hospital patients must be followed up, their home treatment must be supervised, and their progress recorded. Successful research into the fundamental causes of rheumatism cannot be secured by mere money and organisation: we need information about the behaviour of the disease, the effects of rest, exercise, gold and other measures upon its manifestations, which can only be obtained by accurate record-keeping over long periods. The physicians in the central unit should set the standard of case-recording, and during their consultative visits to the local centres should see that it is maintained and turned to account. The blind provision of outpatient physical treatment to large numbers of people with "fibrositic" aches and pains must be avoided, for in many of them the pleasant ritual of treatment will be found to perpetuate the complaint. This is exemplified in the cases recently described by two American Army physicians as "psychological rheumatism."[2]

A rheumatic diseases service built up on these lines would require a considerable staff of full-time physicians, thoroughly trained in present knowledge and technique. A sprinkling of academic minds would be welcome among them, but the majority, in addition to a conscientious interest in their work, need rather the personal attributes that make patients like and trust them, and the faculty of coöperating in friendly fashion with their colleagues—qualities that do not always go with the purely scientific bent. It will take time to find and train this staff, and there will be shortages of most kinds of specialists after the war; but we may hope that the hospital surveyors now at work will include in their recommendations both men and accommodation for the treatment of the rheumatic diseases on an adequate scale.

AT the annual meeting in Edinburgh of the Royal Victoria Hospital tuberculosis trust it was announced that the University chair of tuberculosis, whose endowment has been assured, is shortly to be filled.

THE list of fellows of the Royal Society elected last week includes, strictly speaking, the name of only one medical man—Dr. B. A. McSwiney, professor of physiology and dean of the medical school at St. Thomas's Hospital, and an authority especially on the physiology of plain muscle and the circulation. He shares our warm congratulations, however, with several other new fellows whose investigations have made them almost honorary members of the profession. We are happy to note the recognition given to the work of Sir Jack Drummond, professor of biochemistry at University College, London, Mr. A. T. Glenny of the Wellcome Physiological Research Laboratories, Beckenham, Mr. W. H. Kermack, research chemist at the Royal College of Physicians of Edinburgh, and Dr. G. F. Marrian, professor of medical chemistry at Edinburgh.

2. Treusch, J. V. and Krusen, F. H. *Arch. int. Med.* 1943, 72, 231.

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Annotations

INTRAVENOUS HAZARDS

SIMPLE intravenous infusion is often undertaken in a lighthearted spirit. "Shoving-in" some blood, "jamming-in" a few c.cm. of intravenous 'Pentothal,' the gay "exhibition of a syringe" and a pad of spirit-soaked wool, and some "plugging around" with a needle for a vein are commonplace enough. The difficulties and dangers of intravenous therapy were discussed by the Medical Society of London on March 13, with Prof. Grey Turner in the chair. What Mr. R. H. Franklin called "a shady piece of work under a towel" is all too likely to engender risks which could be avoided, and it is time the venesector was given more elbow room as a skilled mechanic in the surgical or medical team. A,B,O,M,N, rhesus, pyrogenic and anaphylactogenic substances all lie in wait to trip the incautious or faulty technician, and Dr. C. J. C. Britton advocated the test-tube rather than slide methods of grouping. Knott[1] has recommended routine tube cell-tests with standard sera, serum tests with standard cells and cross-matching at 37° C.; subgroup agglutinins, especially sub A and B in group O's and rhesus-positives acquired through previous transfusions, will not be missed if these precautions are adopted. When caution in administration is added the "perfect tissue graft" of Whitby[2] should be attained. It is fortunate that the non-specific reactions from pyrogenic bacterial and other proteins—often due only to lack of cleanliness with apparatus—are so rarely a danger to life. The same is not true of heat hæmolysis or cold agglutination, and stored blood must clearly be used with care. Truly a bottle of blood can be a nest of hornets. Adequate warning of these risks is not lacking in the everyday medical literature. Indeed so much emphasis has been laid on them that there is some danger of overlooking the more immediate mechanical perils of venous infusion—blood, saline, anæsthetic drug, contrast medium, germicide, protein hydrolysate or whatever it may be. Local infection is still too common, especially in the leg veins, and the risk of leaving needles thinly if at all protected from the blanket can be reduced by bipp or sulphanilamide local dressings. Lawrence Abel's suggestion of ambulatory leg infusion, reservoir in hand, might be risky from the point of view of infection. The dangers of air-embolism, once as scorned as fat-embolism, were again brought out at the meeting by Dr. Keith Simpson. The use of closed pressure-fed reservoirs like the McCartney bottle (when gravity feed and a good sized needle will suffice), of faulty rubber (especially war-time rubber) and leaky bevel unions, and the dangers of fumbling with open venesection are at last becoming recognised. Venesectors are liable at law for accidents with apparatus, for as Kitchin[3] has said, "When an inanimate thing . . . is safe and proper if used with care" it is reasonable to argue that "an accident . . . arises from want of care." The public has a right to expect due care and a degree of skill reasonable for the status and experience of the operator and will assuredly obtain judgment in the absence of either. It is a sign of the healthy conscience of medicine that distinguished exponents of intravenous anæsthesia have reported their misfortunes with aberrant arteries.[4] Dr. Ronald Jarman urged that if 28% of a group of Canadian soldiers are shown to possess such vessels due caution becomes a matter of "reasonable care and skill." We cannot afford to be ignorant of the possibility, and must ensure that the vessel into which the needle is run is neither pulsating nor contains bright red arterial blood. When an experienced anæsthetist gives warning of the danger of handling phials whose labels have become detached by storage, of unnecessarily concentrated solutions or badly sterilised apparatus, it is time to tighten the standards in infusion technique.

1. Knott, F. A. *Guy's Hosp. Gaz.* 1943, **56**, 253.
2. Whitby, L. E. H. *Lancet*, 1942, i, 581.
3. Kitchin, D. H. Legal Problems in Medical Practice, London.
4. Macintosh, R. R. and Heyworth, P. S. A. *Lancet*, 1943, ii, 571.

OPINION BY POST

MOST of our readers will now have had from the British Medical Association a copy of the full white-paper on the National Health Service (provided by the Ministry of Health), an analysis setting out the BMA council's preliminary views, and a questionary prepared by the British Institute of Public Opinion. The scientific staff of the institute are to be congratulated on having drafted a document which is as lucid and objective as could well be expected. The white-paper proposals are certainly not easy to translate into questions capable of simple answers, and the attempt has involved the use of questions of a length unusual in opinion surveys; but we hope that even doctors who normally stand aloof from "medical politics" will give the time and take the pains necessary to send answers—if necessary falling back on the philosophical formula "don't know." If many questionaries find their way into drawers or waste-paper baskets the survey will lose an important part of its significance.

Taylor[1] has lately pointed out how misleading the results of postal inquiries may be. Normally they are sent only to a representative sample of the people concerned, and since the returns are usually of the order of 30% the sociologist may have no means of knowing what part of his sample has made the decision to return the questionary, and acted on it. But in this case the situation is somewhat different. The questionary is being addressed not to a sample but to the whole of the medical profession. It is thus in fact an attempt at a census. Errors in the drawing of the initial sample are thus being avoided. To overcome the difficulty of the partial return, a detailed personal record is asked for in the last part of the questionary. The Central Medical War Committee already have all these details in hand for the entire profession, and by comparing the data it would be possible to weight the results of the returns—to make them valid for sex, age, nature of work, place of practice, and so on. If some members of the profession do not answer the questions, such weighted results will be more useful than the simple gross totals expressed as percentages. It might still be argued that the inquiry revealed the views of the more intelligent, informed and articulate doctors inside each of the groups studied. The only way to have overcome this difficulty would have been to have interviewed a random sample of doctors drawn from the Medical Directory. A skilled interviewer has a refusal-rate with the general public of under 0·5%. With doctors this refusal-rate might perhaps have been higher, but it would nevertheless have been a small factor when contrasted with the large field of error possibly arising from non-return of questionaries. Unfortunately, the distribution of the medical profession in space—from Burma to Spitzbergen—makes the interviewing of a random sample quite impossible; so the British Institute has been driven to apply the postal method as the only one available.

The study of group opinion among experts is not quite new. Professor Burt,[2] in coöperation with the home intelligence division of the Ministry of Information, has investigated the opinions of teachers and educationists on educational reform. His questionary was even more formidable than that of the BMA, but he used a very small sample. As we said last week, we welcome the BMA and BIPO experiment; for it represents a new

1. Taylor, S. *Public Administration*, 1943, **21**, 109.
2. Burt, C. *Occupational Psychology*, 1943, **17**, 157.

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attempt to make democracy work in a society which is yearly becoming more complex.

INFECTIONS WITH NON-SPORING ANAEROBES

THE frequency of gas gangrene and tetanus in the wounded of the 1914–18 war led to much useful research on the spore-bearing anaerobes, resulting in new methods for their cultivation and identification. The present war has given a further stimulus to the study of these anaerobic bacteria, but so far little attention has been paid to the non-sporing anaerobes. MacLennan [1] has described a gangrenous myositis, to be distinguished from clostridial gas gangrene, due apparently to a symbiotic action between the anaerobic streptococcus and one or other of the aerobic pyogenic cocci, while on another page Forbes and Goligher report a case of generalised infection with a pleomorphic anaerobic gram-negative bacillus, *Bacterium necrophorum*. In peace-time these two organisms, the anaerobic streptococcus and the necrophorus bacillus, are not infrequently associated with severe and characteristic—though to the uninitiated puzzling—infections, and they are likely to be responsible for similar infections in war casualties.

In civilian practice generalised infection with these non-sporing anaerobes is seen most often after difficult labour or septic abortion where there are retained products acting as a culture medium. Pelvic peritonitis, or more typically, septic thrombophlebitis, follows, and from the thrombophlebitis emboli are thrown off into the circulation to be riddled out in the lungs particularly. Empyema is a common sequel to these multiple lung abscesses. Clinically this type of infection is characterised by a remittent temperature to 103°–105° F. associated with daily rigors, signs of lung involvement, an increasing anæmia and a downhill course. Spontaneous recovery sometimes occurs for no obvious reason; the infection resists sulphonamide therapy. Anaerobic blood-culture reveals a non-hæmolytic streptococcus or a fine gram-negative bacillus, alone or associated with each other or with other bacteria such as diphtheroids, enterococci, or coliform bacilli. An essentially similar syndrome has been described by French writers [2] as a sequel to peritonsillar abscess; the anaerobic gram-negative bacillus in these infections is called *Bacillus funduliformis* but is probably identical with *Bact. necrophorum*. These organisms, incidentally, are poorly pathogenic for laboratory animals, and in this respect differ from the *Bact. necrophorum* of calf diphtheria, foot-rot in sheep, and labial necrosis of rabbits. Harris and Brown, [3] who recovered the organism from infected cæsarean wounds, therefore suggested the name "pseudo-necrophorus" for the human variant. Both the necrophorus bacillus and the anaerobic streptococcus, of which there are also several variants, [4] are to be found in the healthy body cavities (mouth, intestine and female genital canal) and infection with one or other of them usually follows some necrosis or devitalisation of local tissue. The range of these infections had lately been reviewed by Meleney and his co-workers. [5] Wounds elsewhere in the body, especially if there is necrotic tissue, may also act as a primary focus, and this is a possible explanation of Forbes and Goligher's case where the infection began at the site of a compound fracture of the thigh.

Routine anaerobic culture needs to be practised more in bacteriological laboratories so that infections of this type shall not be missed. Useful advice is given in the second edition of the Medical Research Council's memorandum no. 2 on gas gangrene.

1. MacLennan, J. D. *Lancet*, 1943, i, 584.
2. Lemierre, A. *Ibid*, 1936, i, 701.
3. Harris, J. W. and Brown, J. D. *Bull. Johns Hopk. Hosp.* 1927, 40, 203.
4. Prévot, A. R. Manuel de Classification et de Détermination des Bactéries Anaérobies, Paris, 1940, p. 27.
5. Sandusky, W. R., Pulaski, E. J., Johnson, B., A., Meleney, F. L. *Surg. Gynec. Obstet.* 1942, 75, 145.

TOO MUCH SUN

Air Commodore Morton told the Royal Society of Tropical Medicine and Hygiene on March 16 something of his experiences in the prevention and treatment of heat effects during five hot seasons in Iraq. Superstitions about sunstroke have been discarded with spinal pads, but the topee is still useful in really hot parts of the tropics. Ill effects from the sun are due simply to overheating of the tissues and body fluids; they are essentially similar to those seen in furnace workers in temperate climates. The least serious result is fainting, caused by temporary cardiovascular disturbance but without derangement of the chloride balance. More serious exposure leads to heat exhaustion. Collapse, profuse perspiration, fall in blood-pressure, nausea, vomiting and severe muscular cramps are associated with a fall in blood and urinary chlorides. Mouth temperature may be normal but rectal temperature is often raised to 100° or 101° F. The victims are usually of the lean, anxious and spare type; many are affected soon after their first arrival in hot climates. Treatment is best carried out in a temperature of about 75° F. Abundant fluid, with glucose and sodium chloride, should be given by mouth. If necessary, 0·9% sodium chloride must be given intravenously, but it is important to keep careful watch on the balance between input and output of fluids; otherwise there is a serious risk of pulmonary œdema. Diuresis and a rise in urinary chlorides are reliable signs of recovery. Attempts to correct acidosis or alkalosis should not be made in the absence of strict biochemical control.

The most serious condition is that of heat hyperpyrexia. Thick-necked chronic alcoholics with high blood-pressure are most often affected, usually after they have been several years in the tropics. Besides a fall in urinary chlorides there is a failure of heat regulation. The flushed face, dry burning skin, delirium or coma are associated with rectal temperatures up to 108°–112° F. If life is to be saved the temperature must be brought down quickly to 102–103° F. by whatever means are at hand. In active service conditions, an iced enema is indicated, but this interferes with the recording of rectal temperatures. In hospitals, sponging with cold or iced water and the use of fans should be continued until the temperature falls. A useful wind-tunnel was improvised with a shock cradle covered by a blanket. Ice-bags were hung from the roof, and fans blew a stream of cold air over the body. Air-conditioning of wards is a great help to nursing; 60° F. is the temperature recommended for the initial stages, but as soon as the danger from hyperpyrexia is past the patient should be nursed at 75° F. Fluid with salt and glucose should be given by mouth; intravenous salines are seldom needed unless vomiting is persistent—they may do harm by overloading a failing circulation. It is important to be sure that symptoms are not due to malignant tertian malaria, and intravenous quinine should be given if any doubt arises.

Much can be done to prevent casualties from heat effects by ensuring that newcomers are introduced gradually to the sun, and by arrangement of working hours so as to allow as many as possible to spend some of their off-duty time in air-conditioned rooms. Men should be encouraged to "drink more water" and "eat more salt." When the thermometer is really high, extra salt should be put in the food. To ensure that this is done the medical officer may have to take his courage in one hand and a bag of salt in the other and have it out with the cook.

Brigadier F. A. E. CREW, FRS, has been appointed to the Bruce and John Usher chair of public health in the University of Edinburgh in succession to Prof. P. S. Lelean who has retired. Dr. Crew has held the Buchanan chair of animal genetics in the university since 1928, but for nearly two years has been working in the medical department at the War Office, where he is director of biological research.

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Reconstruction

THE WHITE PAPER REVIEWED

V.—By a Medical Officer of Health

Not all white-papers are so lucid and well written, and none has been of such fundamental importance to the health of the nation and the future of the medical profession as that on "A National Health Service." For years the cry for reform has gone up; and here, in broad outline, leaving innumerable details to be filled in after discussion and negotiation with the various interests affected, but with the main pattern nevertheless clearly discernible, is the translation of that cry into a concrete plan. Whatever the disagreement on detail, not many will be bold enough to dispute the need for some amendment of existing schemes for medical care. The trouble arises from the fact that while we are all in theory in favour of change, our own personal roots (and in the case of hospitals and local authorities our corporate roots) have struck deep and we resent and fear change. And when these changes appear to affect our own individual interests adversely—whether we be private practitioner, whole-time medical officer, voluntary hospital or local authority—we resent the change the more.

That resentment is bound to be evoked by the white-paper. There are thousands of doctors and hundreds of hospitals and local authorities who are today doing a good job of work, which will be interfered with or transferred to some new authority in the future, without the job necessarily being better done. In these circumstances an outcry is inevitable, but the overriding argument is the fact that there are many other areas where the work is not done at all, or is badly done, and where improvement is impossible, for financial and other reasons, except within the framework of the new proposals.

ORGANISATION AND THE PRACTITIONER

State medicine was born after Chadwick's famous report in 1842 on "The Sanitary Condition of the Labouring Population in Great Britain." His evidence that the greatest proportion of deaths leading to the need of poor relief for widows and orphans were due to preventable causes arising from refuse, damp, filth and overcrowding, that they occurred mainly in workers under the age of 45 (13 years below the comtemporary Swedish expectation of life) and that they caused 8–10 years' loss of working capacity, was overwhelming, and the government action which followed enabled Simon to nurse environmental hygiene into vigorous adult life. In the fullness of time the personal health services—school medicine, maternity and child welfare, tuberculosis, immunisation, &c.—were added to the original environmental services, to meet needs which were not being met in any other way, and the national vital statistics, including at long last those of maternal mortality, bear witness to their success. The national health insurance service was of the same parentage as these other personal health services but fell conveniently into the framework of private practice. Apart from the difficulty of unequal distribution of medical services, medicine too, like nearly every other human activity, has suffered from the burden of increasing mechanisation and closer coördination of its various branches seems inevitable.

The same industrial conditions which led to the establishment of the public health service stimulated the foundation of hospitals, both poor-law and voluntary. Serving the same main purpose, they achieved it in widely different ways; and again it is not unreasonable to think that a hundred years later the wheel has come full circle and a closer identity of methods and machinery is desirable. Only by close coöperation and coördination can the best use be made of the grand facilities which exist. The tendency towards regional coöperation was evident before the war; the white-paper simply clarifies the issues and indicates the machinery. "The stage has been reached, in the Government's view, at which the single comprehensive service for all should be regarded as the next natural development"; and again "the care of personal health should be put on a new footing and be made available to everybody as a publicly sponsored service."

The implementation of such a scheme clearly involves both organisation and reorganisation, and large-scale organisation is not without its dangers in a service so intimate as that which a doctor renders to his patients. This is clearly recognised in the white-paper.

"There is a certain danger in making personal health the subject of a national service at all. It is the danger of over-organisation, of letting the machine designed to ensure a better service itself stifle the chances of getting one. Yet medical resources must be better marshalled for the full and equal service of the public, and this must involve organisation—with public responsibility behind it. It is feasible to combine public responsibility and a full service with the essential elements of personal and professional freedom for the patient and the doctor; and that is the starting point of this Paper's proposals. Throughout, the service must be based on the personal relationship of patient and doctor. Organisation is needed to ensure that the service is there, that it is there for all, and that it is a good service; but organisation must be seen as the means, and never for one moment as the end" (p. 8).

That is clearly the right spirit in which to tackle the new service, and many safeguards are offered both to guard the fundamental liberty of the profession and to indulge some of its foibles: (*a*) practice may be whole-time public or whole-time private, or part-time in both; (*b*) it may be grouped in health centres or outside groups, or single, or part-grouped and part-single; (*c*) it may be remunerated by salary and/or by capitation fee; (*d*) the practitioner will be employed by a Central Medical Board and thus enjoy a very high degree of security and of freedom from local interference; (*e*) he can influence policy centrally through a statutory Central Health Services Council, able to advise not only on matters referred to it, but on any matters within its province on which it feels it right to express an opinion, and locally through Local Health Services Councils, not only advising the new joint authorities, but also with power to submit their views and advice to the Minister. (*f*) Compensation and superannuation machinery is provided for.

Why should a medical officer of health, in commenting on the white-paper, concern himself with these arrangements for general practice? The answer is that most medical officers of health retain some clinical duties and that all should retain a clinical spirit. No health service will be worth the name which does not give practitioners the fullest freedom in their professional relationship with patients. The white-paper not only does this but arms the profession with very strong weapons for influencing the growth and development of the medical services. As environmental medicine expanded into preventive medicine in the wider sense, so preventive medicine, the modern "public health," is expanding into social medicine. The more the practitioner is imbued with the spirit of social medicine, the better for the well-being of the community, and this the white-paper proposals seem not only to safeguard but actually to foster. Apprehensions, too, about interference with the doctor-patient relationship seem to be disposed of, once and for all.

THE LOCAL AUTHORITIES

The white-paper proposals on local-authority areas and powers are obviously a compromise, pending the opportunity to give detailed consideration to local government generally. (Rome was not built in a day and social reconstruction cannot be arranged in such a manner as to be brought into operation on an appointed day by the pressing of a button.) The changes affecting local government are however as drastic as those affecting private practice. With few exceptions, existing local authorities will lose their hospitals, including mental and infectious-disease hospitals, to the new joint authorities, and more than 200 authorities will lose maternity and child-welfare powers in the same way as a slightly smaller number are now losing educational powers. (Incidentally, in my opinion, much too low a value is set in the white-paper on the special skill acquired in the course of years by maternity and child-welfare medical officers.) The tuberculosis service is re-oriented. While the number of authorities responsible for personal health services is reduced, the total number is increased by the formation of the new joint authorities.

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The London County Council is referred to as a ready-made joint authority. It is already the education authority and will presumably become the maternity and child-welfare authority, displacing boroughs like Islington, Lambeth and Wandsworth with populations and resources comparable with those of cities such as Bradford, Leeds, Sheffield and Hull, and cities such as Westminster with still richer resources and equally proud traditions. The white-paper, it is true, contains proposals for allowing delegation of powers, as does the Education Bill; but boroughs such as those mentioned are unlikely to surrender powers without a pang and possibly without a struggle. It is also arguable that Tottenham, Ealing, Hendon, Willesden and a dozen other suburbs are intrinsically just as much part of London as Hampstead and Woolwich and should be dealt with in the same way when reorganisation is in the air.

On points such as these, affecting the history, traditions, and—as will be thought—civic liberties of historic areas, contention and strife are almost inevitable.

THE MEDICAL OFFICER OF HEALTH

On the part of medical officers of health and others, the white-paper contains only one brief paragraph, indicating increasing calls on them and an even more important part in the future. It would be idle to pretend that the relations between medical officers of health and medical practitioners are always free from friction and suspicion; but there are many areas where official relations are completely coöperative and personal relations harmonious. (Medical officers of health have even made welcome secretaries of BMA divisions.) If the fear of encroachment on the sphere of the private practitioner can be removed, as the new proposals should remove it, and if the general practitioner can be sure that his interests can be properly represented, as through the Health Services Councils they should be, a new era of coöperation and teamwork may be possible.

This should be still easier if the practitioner could be brought to realise that administration is an art demanding a high degree of skill and experience. The medical profession as a whole is curiously ignorant and curiously contemptuous of it. The average hospital matron knows far more about it than the average doctor. Even medical certification tends to be looked on grudgingly, as a piece of possibly necessary red tape, interfering with the doctor's real work. The administration of a hospital in England (but not in Scotland) is felt to be a lay rather than a medical function, and the administration of a whole group of hospitals and health services is a mystery which passes the majority of the profession completely by.

And yet, if we are to have comprehensive and coördinated services, this question of administration is fundamental. The planning of services; the siting of health centres; their equipping with furniture, drugs, dressings and instruments; the supply of ancillary personnel, lights, telephones, stationery and the inevitable record forms—these do not just happen. The local poor-law, public-health and voluntary hospitals will not coördinate themselves.

All these things can probably be better undertaken or initiated by a medical man with administrative training than by a lay administrator, and on the whole the medical man is probably the more likely to understand professional needs. If this is so, the medical officer of health, as the trained medical administrator, clearly has an increasingly important rôle. The one thing he must not do—and will not want to do—is to come between the clinician and his patient. As a liaison officer between his council and the medical services council the medical officer of health can also be invaluable. This suggested function will not prevent direct contact between the two, it will merely supplement it. And such supplementation is genuinely necessary, as for instance in the plans which the new joint authorities are to formulate.

OPPORTUNITIES

The doctor is not a political animal; neither in local or national political life does he play a part comparable with that played by other professions. Of local as well as of national government he has much to learn, and he is still in general far from sharing the view of Graham Wallas, that, "for the average English citizen, the possibility of health, of happiness, of progress towards the old Greek ideal of 'beautiful goodness' depends on his local government more than on any other factor in his environment." Or of Sir Ernest Simon, that "the city council's services mean the difference between savagery and civilisation." Here, in the white-paper proposals, is the opportunity for medicine to become an integral part of these communal services, and yet to retain every freedom essential for the proper conduct of the profession—to obtain, indeed, an enlarged and enlarging scope.

Good food, good housing and work are, as the BMA stresses, fundamentals, but a good medical service is not less fundamental and should indeed play an increasingly authoritative part in directing the nation's attention to places and people where the first are lacking. Professional numbers should be adequate to give the scheme a fair start. Properly distributed, 20,000 practitioners, each with an average of 2500 patients, will cover the total population. That leaves more than 30,000 medical men for hospitals, public health, laboratory and pathological services, research, the consultant ranks, industry and the defence services. It can be done. It should even be possible to provide services to meet large epidemics (pandemics are fortunately very rare) by the organisation of flying squads of vigorous young practitioners on the lines of those now available for dealing with obstetric catastrophes. A hard-pressed area could have its services reinforced at very short notice. In short, teamwork in every medical sphere could be facilitated.

Even cursory reference by a public-health officer to the white-paper proposals could not omit praise of the promise of a full home nursing service. This is the essential ancillary to the general practitioner service, and the fine traditions developed by the Queen's nurses and others can soon be made to multiply.

It is unnecessary to make detailed comments on the proposals for a consultant service. Firmly founded on the hospital, the consultant and teacher can perhaps do more than anyone else to lay the foundations on which the new service will grow. Undergraduate teaching becomes indeed a responsible job, with direct repercussions on the nation's health and physical wellbeing.

LOSSES AND GAINS

The proposals will of course evoke opposition. Not every doctor will agree that individual liberty can be preserved as a member of a team, nor that in the medical sphere teamwork will produce better results than individual effort. Monetary gain is a natural human incentive and many men may feel that in the long run their financial opportunities will suffer, to the detriment of their families. Those who feel this will not regard it as adequate compensation that the financial status of other members of the profession will be improved. Averages appeal only when they do not affect one adversely. Many medical officers of health, who will not be affected by the financial angle, will be genuinely afraid that the new proposals will have an adverse effect on certain health services in their particular area—services into which they have put toil and sweat. Local authorities, with pride in many decades of service, with historic traditions, and with feelings of intense local patriotism, will regard the new proposals as invasions of local-government powers and responsibilities and of civic liberties, as a negation of the things for which we are fighting in a war which, while it has not yet reached its maximum toll in the ranks of the fighters, has already probably caused more civilian misery, disease and death than any war in history.

And yet, the object of government is the greatest good of the greatest number. If these proposals are to the ultimate benefit of the 46 million inhabitants of this country, they are more than justified. Only by this standard is it permissible to measure them, and if need be to oppose them by more constructive proposals. No professional interest, no sectional or corporate interest, should be considered an adequate yardstick for opposition. These interests can and should be safeguarded within the wider framework.

The proposals maintain government of the people by the people and give a chance of an ordered and logical development of the health services. For half a million

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years mankind has been on the march, and during the last 10,000 years has achieved the beginnings of civilisation. Provided humanity does not blow itself into non-existence by its inability to control the products of its own inventiveness, the next 10,000 years can achieve some real progress along man's evolutionary road. The health services can assist that progress by the full use of the "eye that hath kept watch o'er man's mortality." Physical well-being is in itself no mean goal, but properly regarded it is but the precursor to a fuller mental life. And maybe, to regard the white-paper's proposals *sub specie æternitatis*, instead of from the narrower angle of one's immediate interests, will give a more detached picture of its real value.

In England Now

A Running Commentary by Peripatetic Correspondents

WHOEVER talks of the dead hand of officialdom or grouses about state enterprise being impersonal has never read the annual report of the Chief Inspector of Factories. The most diehard individualist must admit that here is a human document. Take the discussion of accidents due to hair entanglement. After pointing out that to make caps compulsory is useless unless they are going to be accepted by a majority of those concerned, the report says: "In fact, until some highly popular lady popularises a fashion in hair-dressing which will make the present puffs and curls unfashionable, I have little hope of the cap being a complete protection against this type of accident." Even our industrialists are appreciating the human touch. One large firm has awarded a prize of £50 for the best design submitted for such a cap, while another firm maintains a safety cap shop in the works where various designs in different colours and materials are displayed, and in which women and girls can try on as many as they wish and pick the style suitable to their taste. Another example of how industry is gradually being humanised is the tremendous advance that has taken place in the provision of canteens. There is the story of the ordinary garage with the usual repair shop, now employing 18 women in each of two shifts. "A small adjoining house has been rented and the lower rooms and kitchen brightly painted; the canteen has small tables with flowers on each. Upstairs there is the sanitary washing and clothing accommodation. The employer's wife comes daily to the works and takes an interest in all these arrangements, giving a personal touch that it is hoped will continue in industry after the war." There is ample evidence in the report of how the older people are pulling their weight in this war. In one district more than half of the ten fatal accidents occurred to men over 60—the older men are "not always willing to admit that they have in some ways lost their sprightliness." But the most impressive tale is that of the employer who had persistently refused all offers of part-time female labour from the employment exchange. Finally, however, he had to give way and employ elderly women, some of them over 70, in his packing department. "The experiment was entirely satisfactory and the employer is convinced that the present flow of production could not be maintained without what he now describes as 'my old dears.'" And yet we still refer to the burden imposed on the nation by the increasing proportion of old folk in our midst. This story deserves a place on the front page of every newspaper in the country. Or what a subject it would make for one of our more intelligent film producers.

I hope there are not many works managers like the one here recorded, as thinking that no means of ventilation was necessary because his workshop was new. But how about this example of incompetence? In an engineering shop in Scotland a battery of small fans was erected along the factory roof to provide ventilation; alternate fans were arranged to blow in and to extract, thus providing an almost complete short circuit between each pair of fans. Factories that are practically sealed boxes, from the point of view of ventilation, are still being erected. HM inspectors show their understanding of the psychology of those in industry in summing up the problem of lighting in factories: "Although evidence has not yet been produced of definite physical disability due to black-out where the artificial lighting is good, there is little sign that public opinion in factories would be willing to accept the proposition that artificial lighting, even at its best, is just as good as daylight. Whatever the reason, daylight is preferred and people do not like being deprived of its enjoyment. Bearing in mind that 'man only came indoors yesterday' this is not surprising." It is in the discussion of personnel management that this psychological insight best shows itself. "A very experienced personnel manager recently asked a woman on the floor of a factory what she really wished to have available and the reply was 'an understanding person to whom we can go and discuss our difficulties.' It would be difficult to get a better definition of the real welfare work that is now so necessary for the assistance of the large body of women who are coming into industry, a little nervous of what they are going to meet and a little confused at what they find." "The wise and efficient personnel or welfare officer seems just the person capable of dealing from both angles with the young lady who put on her application for release 'I dislike work and I hate being pushed about from pillar to post.'" I defy anyone to spot the following masterpiece of human understanding as the penultimate sentence of an official Government report: "We must therefore give every credit to those of all grades and classes who continue on an even course in spite of the growing strain of work long continued, with lack of the usual changes of diet, lack of holidays and even in face of the price of tobacco and beer." What I cannot understand is why, especially in view of the hordes of public relation officers whose existence has just come to light, full use has not been made of this report to encourage public morale, let the electorate know what is being done for them by abused Government departments, and make industrial relationships run more smoothly.

* * *

I was being shown round a patient's well-kept garden by his wife last summer when we came on some cucumbers of unsurpassed magnificence. Seldom outside a show had I seen anything to equal them; but my praise fell on stony ground, "I wouldn't touch them," said my guide, "not with a barge-pole; I don't like the way they are grown—terribly unhygienic—I let the gardener keep them for his own use." Something warned me not to probe further, and we passed on to admire the flower beds.

My own attempts at cucumber growing having always been a dismal failure, I cross-examined the gardener two days later. After extravagant appreciation of his horticultural efforts (see Dale-Carnegie on *How to Win Friends and Influence People*) I delicately approached the subject of the cucumbers. Instantly he was on his guard, and shifted uneasily from one foot to the other. I judged that the moment had now come for a little mild corruption, and he pocketed my half-crown with evident satisfaction. "You won't tell Johnstone?" he anxiously inquired. (Johnstone being the proprietor of a local hotel, to whom I suspect he sells the cucumbers and probably other illicit vegetables.) "Of course," he went on when I had promised to be discreet, "I wouldn't mention this to just anybody, but you being a doctor will understand." "The truth is there's nothing like mare's piss for watering them cucumbers, especially if she's near term." "Farmer Smith's land-girl saves it for me—she's a married woman or I wouldn't have asked her." This knowledge of endocrinology shook me badly, and I hastened to ask if he was familiar with the work of Aschheim and Zondek; but no, he had had the tip from his uncle who had been a gardener in gentlemen's service for over fifty years.

Mentioning this later to a Well-Known Obstetrician I found him unimpressed—he lives in a flat and takes but a languid interest in gardens—but he directed my attention to an observation by Aschheim that the growth-stimulating properties of pregnant urine were familiar to the ancient Egyptians who utilised them as a test for pregnancy. A papyrus over 3000 years old contains the following instructions. "Let the woman take a pinch of corn and a handful of good earth and mix them in a shallow vessel. Each morning she must pass a little urine into the vessel. If the corn sprouts she is surely pregnant."

Well, there it is, if the information provides the basis of a cucumber test for pregnancy—or even makes two cucumbers grow where one grew before—my half-crown has been well spent.

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Parliament

ON THE FLOOR OF THE HOUSE

MEDICUS MP

WE began the week with an invitation sent by the members of the House of Commons in their private member capacity to the Congress of the United States in their private congressmen capacity. The original invitation went to Mr. Speaker Rayburn, whom we have had the opportunity of hearing in conversation over the radio with Colonel Clifton Brown the British House of Commons Speaker. The visit will be paid after the USA election in November, and as it is to be a House of Commons and not a Government affair all arrangements will be made under the authority of members of Parliament and not of the Government. No doubt there will be a return visit, and the interchanges will help us to tackle the difficult jobs of the post-victory world.

The House passed from this to civil aviation, which it discussed for many hours. Then to the intricate problems of the India (Attachment of States) Bill which fluttered down to us, as it were, from the House of Lords. What do you know, gentle reader, of the states of Kathiawar and Gujarat and of the third and fourth-class states of Kathiawar that "are classed as Taluqdars when we are totally different from Taluqdars and Thana owners"? As much perhaps as many MPs and perhaps more if you have Indian experience. But the House passed the bill through all its stages. And apparently there is likely to be a growling of legal thunder about it in the future.

On the next day we had a debate about housing, in which the Minister of Health had a rough passage because he had to propose what are, practically speaking, emergency measures for the erection of 300,000 houses in the first two postwar years. Date not fixed. And this is to be done before the trinity of Barlow, Scott and Uthwatt reports have been applied to any master plan.

But on the third and fourth sitting days Mr. Willink sailed into calmer waters with the discussion on the national health service. The white-paper got a good reception from all sides. The Minister set out the four principles which govern the main features of the Government's proposals; that is, free choice of doctor by the patient, freedom of choice of method of practice by the doctor including private practice. This latter form of practice, Mr. Tom Johnston told the House in winding up, still continued in the Soviet Union till recently and may still continue. A more controversial main feature was that of giving the Central Medical Board power to require newly qualified doctors to serve in the early years of their work where the needs of the service may require. That is a necessity imposed by the shortage of doctors, which will continue for a period as at present we are only taking into the profession something over 2000 a year. This requirement is to be implemented by persuasion, and we shall regard the young doctor, the Minister said, quoting Osler's words, as "The Man behind the Gun." Other features of the Government's proposals are the rationalisation of hospital services and the building up of hospital areas. This seems to be in practice the application, in a general sense, of the ideas of hospital coördination and coöperation now in practice as the EMS hospital system.

The local government main feature was rather more sketchy than the others, but it means larger areas, as a rule, for hospital administration. But that has not been worked out. Most of our hospital accommodation is, as is well known, concentrated in definite areas of the country—London and Birmingham are examples—leaving other areas, such as the eastern counties and the south-western counties, relatively bare. There will have to be some realistic thinking about hospital distribution in the country as a whole—and some building may be unavoidable even when all EMS accommodation is taken into account.

Throughout the debate a ding-dong between the new looking forward to the future and the old way of thinking, looking backwards to the past. But the stress was on the ding of the future—not the dong of the past. Defenders of the voluntary hospital rushed into the fray crying "ruin" because of the expected death of contributory schemes. This fear was exorcised neatly by Miss Horsbrugh, who said that a universal contributory scheme was being substituted for a number of partial schemes. It looks indeed, from the figures Mr. Willink gave, as if the voluntary hospitals will be financially more stable, and the 25% of them which are only now kept going by EMS payments would have the chance of putting their house in order more conveniently than would otherwise be possible. The burden of the advice to the voluntary hospital was to "come in and help with your experience, your knowledge, your scientific resources."

The second day of debate was wound up by Mr. Johnston in a speech which stressed the great value of the EMS hospital as a contribution to the future and the great possibilities of coöperation between voluntary, public authority and state hospitals. The big conceptions of the service prevailed although there were a few dissentient expressions squeezed out of members especially identified with some of the smaller voluntary hospitals. But when the resolution of approval of the proposals of the white-paper were put to the House, the ayes were many and the noes one solitary voice. And even this voice, frightened of its solitude, did not persist at the second calling, and the resolution passed with a loud aye for the establishment of a comprehensive national health service.

THE WHITE PAPER DEBATED

In the House of Commons

MINISTER SOLICITS APPROVAL

Mr. WILLINK said the object of the scheme was to raise national health to a higher plane and keep it there, and to use the nation's resources to raise it even higher. It should be regarded as part of the bigger process of reshaping the background of national life by freeing its members from the anxieties, burdens and pains of ill health. Everyone was to contribute to the cost, whether by taxation, rates or social insurance in the proportion (not yet finally decided) of 36, 36 and 27 per cent. The service proposed was to evolve naturally out of what we had. It was a scheme into which every one of present elements could put their best, provided they accepted the four main principles:

(1) The whole of the health services must be available to every person.
(2) No patient or doctor must be dragooned into any form of treatment
(3) Responsibility must rest centrally and locally with the elected representatives of the people.
(4) Subject to full democratic responsibility, the health service must benefit from the best professional and vocational guidance we could obtain.

The working of the scheme within these principles implied, first of all, the free choice of doctor. Most people now preferred to choose their own medical adviser and to be free to change to another, and this choice must remain as long as people wanted it to remain. (Challenged by Dr. SUMMERSKILL with the discrepancy that everyone in hospital would be treated by the service, Mr. WILLINK replied: If you want to go to a hospital that is a different matter entirely from choosing a private doctor.) The Government believed, he said, there was no place for anything which could reasonably be called a regimentation of the medical profession. Despite rumour to the contrary, there was no intention of seeking to establish a full state medical service, but where doctors practised in public health centres they must not compete between each other. Many practitioners believed that their best work could be done in specially designed and equipped health centres, where patients chose their own doctor and team work could cover emergency, time off, holidays and refresher courses. The idea sounded sensible and attractive, and he would like it to be tried out fully and fairly, but the Government did not believe that private practice should be either prohibited or isolated. Nothing could be more unfortunate than to divide the profession into two classes, but there must be some measure of control to secure the better distribution of practitioners and there was a strong case for requiring all young doctors to serve an apprenticeship. In a service provided by public money, the public had a right

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to rely on the doctor being experienced. The area plan would ensure that people could get to the right hospital at the time of their need. At present the greatest lack was in the provision for consultant and specialist services, which needed to be increased and distributed fairly.

Turning to hospitals, Mr. Willink said there was widespread belief in both the voluntary principle and the local government practice. He wanted both types: the voluntary hospitals to be paid, not as paupers according to their need, but as partners in relation to service given. They would receive standard payments, locally from the joint authority and centrally from social insurance contributions. This must necessarily affect the hospital contributory schemes, because everyone would be covered by his social insurance against prolonged illness involving time in hospital, but voluntary hospitals would come to no harm from the change. Taking for instance the prewar year 1938, voluntary hospitals derived £5·3 million from contributory schemes and collections. Had the new Exchequer payment been then in force this would have amounted to £6·5 million. And there was another factor. In 1938 the voluntary hospitals received £0·9 million from local authorities for public services. They would now receive far more than that from the joint authorities.

Far from removing the function of local authorities, the new service, Mr. Willink concluded, would add great duties to them. The scheme offered immense opportunity for those who took an interest in hospital and health services in their own part of the country. When brought to fruition, the plan would be one long to be remembered for good in the history of the British people.

MEDICAL VOICES AT VARIANCE

Sir E. GRAHAM-LITTLE (Ind. C., Univ. Lond.) began with the conversations between Mr. Ernest Brown and the Representative Committee, until Mr. WILLINK recalled that these were confidential. He then contented himself with quoting from a press report a single phrase used by the late Minister, that it was proposed to secure control of the medical profession "in order to keep a firm hand on the issue of certificates." Speaking as representative of the university with the largest medical faculty in the world he said: "Surely it is impossible to work a scheme, if those who operate it are intensely resentful of the conditions imposed upon them." Less than 10% of those who would be asked were in favour of it. The health centre idea had attractive features, but was it consistent with a free choice of doctor? The present admirable series of cottage hospitals in the country were based on team work, but where was the infusion of specialist assistance to come from in the new centre? The prospect, he feared, was illusory. The Beveridge report had been franker about the scope for private practice than the white-paper, with its ominous sentence that the control of the general practitioner would be much stricter than that of any other section. The Minister said there would be no direction,[1] but we knew that practitioners were to be under the strict rule of the Central Medical Board. He regretted the end of contributory schemes, for the voluntary hospitals had become a great coöperative system, popular with every section of the community and offering surgeons and physicians a measure of leisure and opportunities for research.

Dr. HADEN GUEST (Lab., Islington) denied the previous speaker's claim to represent any large part of the medical profession. Choice of doctor would be as free at a health centre as elsewhere. In his most bitter moments he had never thought the Government's scheme was based on a desire to secure control of the medical profession in order to control certification. On the contrary, the ideas put forward were in their main outlines acceptable to a large proportion of doctors. It was certain that the thousands coming back from the war would be drawn to the health centres and would be willing to work in group practice, because it was the kind of thing they had been doing. Lessons learned in wartime would be used for the benefit of the civil population. But he would like the House to limit the duration of the commercial side of practice: were practices set up in the future still to be saleable or not? He thought the opportunity for the voluntary hospitals was the greatest they had ever had. To stand out from the scheme would be to dwindle away. If they were wise they would say: "We will join this regional grouping, giving to it everything good we have to give in the way of scientific knowledge, consultants and apparatus." The chief postgraduate research hospital, now in an LCC institution, gave an indication of how great a thing the future hospital service might be. But pay wards must go: there should be one standard of hospital treatment.

Dr. A. B. HOWITT (C., Reading) said the Minister must realise that the white-paper had had a good reception. The great majority of the medical profession welcomed it. But although the Minister had spoken kindly of the voluntary hospitals, he felt that they had had but a poor deal in the white-paper. If the contributory scheme was dead—we had to face that—then something should be done to make them feel that bigger work lay ahead. We needed the initiative and independent spirit for which they were famed. All these years the people had called them *our* hospitals. He felt pretty sure the replies to the BMA questionary would show that the medical profession was against any great increase in the salaried service. The average doctor today was frightened he would have more forms to deal with; he did not want to be dragooned. To run the scheme would require 50% more doctors, but he feared the white-paper as it stood would not attract the best recruits, who needed the inducements of scope for initiative, hard work and independence. The Central Health Services Council would be far more useful if doctors elected their own representatives.

Dr. H. B. MORGAN (Lab., Rochdale) paid tribute to the white-paper. Incubation had been delayed, but it was a healthy infant, perhaps a little emasculated. To achieve even half the proposals would make a landmark in the health services. True it was not comprehensive; the nursing side was neglected, environment left alone. There was to be a central medical board; why not a central health board, as employing authority, with all the institutional workers, health visitors, nurses and everyone in the hospitals combined under it—good Whitley councils for discussion of working conditions? He regretted the neglect of occupational mortality; there was not one lecturer on industrial medicine in any medical school in this pioneer industrial country. It was all left to be got up later by the health services council. There was no interdepartmental committee linking up medical education and research. Voluntary hospitals were not right in sheltering behind the excellent umbrella of the brilliant medical and surgical work done there. Many municipal hospitals could rival them. A lot of fuss had been made about dual control, which the Government proposed to continue, allowing those hospitals which contracted out to have practically the whole of their costs paid. But, on the whole, the scheme was on the right lines, with adequate representation and good consultants. It didn't matter if one institution had to give way; the essential was to have both hospitals and doctors properly distributed. Turning to the Central Medical Board, doctors, he said, were afraid of bureaucrats, especially medical bureaucrats. In all the services run by the Government, there seemed to be a blight to keep the doctors down and to stifle initiative; he asked for a pronouncement that the directionary powers of the board would be used with discretion and discrimination in the endeavour to give the public a good service.

Sir HENRY MORRIS-JONES (L. Nat., Denbigh) described the white-paper as the ablest state paper he had ever read. But if the scheme succeeded it would practically abolish private practice. There was an element of compulsion in it that he did not like. If a doctor practising in an industrial town had an invalid wife, he could not move to a seaside resort unless the Central Medical Board allowed him to go. Young doctors, too, must serve a period as assistants. New Zealand doctors had totally and resolutely declined a salaried state service. (Mr.

1. In his opening speech Mr. Willink had corrected the word *when* to *where* in the paragraph on p. 11 of *The White Paper Proposals in Brief* ("to give his full time to the public service *where* the needs of the service require this"). Apart from that small correction in abridgement he thought the sentence in the white-paper itself (p. 35) might read more appropriately in slightly fuller form, thus: "The Board must also be able to require a young doctor entering the public service to give his full time to that service during the early years of his career in cases where the needs of the service require this." This sentence, he remarked, does not point the way to any direction of the kind to which we are accustomed during the war.

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GEORGE GRIFFITHS: "Not totally declined.") What they have declined the doctors of this country are not likely to adopt.

Dr. EDITH SUMMERSKILL (Lab., Fulham) said that some of the finest doctors in the country were in the salaried medical services. The white-paper put the interests of the doctors before that of their patients. But it was planned primarily to cure disease instead of to prevent it; there was a danger of making the nation medicine-minded instead of health-minded. The general practitioner service would accentuate instead of removing social distinctions in the treatment of disease. Allowing the service doctor to take private patients might mean a doctor arriving late at the health centre because a wealthy old woman had a headache and was willing to pay a large fee to have her pulse felt. To allow publicly-paid doctors to take fees would foster hostility among them. Patients would still have the feeling that if they could pay the doctor they would get better treatment. A charming bedside manner should not determine the number of a doctor's patients or the size of his quarterly cheque; we must protect the people against themselves. When a patient went to hospital we directed him to the right doctor, and did not ask, "Will you have that rather gruff and ugly surgeon over there or that charming young house-surgeon?" Mr. Lloyd George had said in 1911, "The first thing for us to consider is whether we are doing the best for the community we represent." Other countries had shown that the one standard hospital was the ideal to be attained. Were women in the postwar world still to be denied entry into the teaching hospitals? The Government hoped to starve the voluntary hospitals into submission, but that would take a long time.

Sir JOHN GRAHAM KERR (C., Scot. Univs.), an associate of the Medical Parliamentary Committee, said the success of the scheme would be determined by the capacity of the personnel who have to carry it out. He reviewed the inducements to bring highly qualified young men and women into the medical profession. They had been trained by leaders of the profession, who had achieved their position by experience, by innate ability and by success in the various departments of medicine and surgery; they taught mainly in the ward and the laboratory of the voluntary hospital. But there were also attractions of a material kind; the prospect of attaining to dignity and recognition meant more to them than the safer course of mounting up slowly step by step in a safe and organised profession.

ANXIETY ABOUT HOSPITALS

Mr. S. STOREY (C., Sunderland) thought the Government did not understand the essentials of the voluntary system. Take the white-paper's description of a voluntary hospital as in essence an independent charitable organisation. That was thoroughly antiquated. The essence of a voluntary hospital was not in its charitable funds but in its tradition, its experience, the facilities it offers for experiment, research and individual teaching, and the opportunities for voluntary public service. The Hetherington Committee had pointed out their rôle in trying out new techniques, new equipment, new methods of treatment. If the voluntary hospitals carried out their part in the service they could reasonably expect to be paid the price for the job, leaving their invested funds for independent experimental work. Even when the voluntary contributory schemes were superseded, working men would continue to subscribe if allowed to take part in the management of their local hospitals. But these should, he thought, welcome on their boards representatives of local authorities.

Mr. CRAIK HENDERSON (C., Leeds) felt it unjust to ask the voluntary hospitals to come under a joint authority. They should continue in friendly rivalry with the others, and it should be laid down clearly what sum was to be paid by local authorities in respect of the number of voluntary beds in the particular area, not just left to local negotiation. He would like to see a hospital grants committee set up analogous to the University Grants Committee.

Mr. A. COLEGATE (C., Wrekin) said the contributory scheme had been of enormous value, financial but also moral, in giving people a pride in their local hospital and an interest in its progress. We should preserve that spirit in one way or another. He hoped the Minister could secure some part of that coöperation between the public and the hospital authorities; the scheme as a whole was a first-rate effort of imagination.

Sir ARNOLD GRIDLEY (C., Stockport) feared that the white-paper sounded the death-knell of the voluntary hospitals as we had known them. If we all had to contribute so many shillings a week to the social-security services few people would continue their voluntary payments. People were already asking whether they should abandon their intention of leaving money to the hospitals. The hospitals were obtaining £18·5 million a year from contributory schemes, from patients' contributions and from gifts by those able to afford large sums. The white-paper certainly did not provide a way to rescue them.

Mr. F. MESSER (Lab., Tottenham) disagreed; the white-paper in his view threw a life-belt to the voluntary hospitals. There had hitherto been no system; the hospitals had been working as uncoördinated units. Neither had the municipal hospitals been working on a system. In some parts of the country their standard had been high; in others they had been the last word in a despairing effort to dodge one's obligations. Under the scheme anybody who needed it would be able to get a bed in hospital without question of ability to pay; that alone would make the white-paper worth while. Joint authorities were not the best way of administering the service. Except where they included county-borough councils they would be divorced from the housing authorities, so that though they could build a sanatorium they could not build a house. A comprehensive health service should deal with every aspect of health. In deciding the grant to hospitals from the Exchequer, rateable values per head of the population would have to be considered; Lancashire, pop. 2 mill., could raise only £40,000 by a 1*d.* rate, Middlesex with the same population £82,000. Every member of the community must be entitled to equal service, which should not press too hard on local finances.

MANY OTHER POINTS

Mr. ARTHUR GREENWOOD (Lab., Wakefield) hoped the Ministry's optimism about the supply of doctors would be justified. Under the scheme it should be possible for every doctor to get a decent summer holiday, and attend a three-month refresher course every three years. He hoped to see a section of the scheme dealing with research; apart from rheumatism, he could give many instances where more intensive research was required. He wanted quick provision of dental and optical treatment and more prominence to mental treatment. Doctors and lawyers were shining examples of 100 per cent. trade-unionism—an absolutely closed shop. The medical profession, quite rightly, had a great professional pride and quite rightly disliked interference. But doctors were servants of the people, and could not determine the future of this scheme; nor indeed could the voluntary hospitals.

Mr. L. SILKIN (Lab., Peckham) asked what was to be the bait offered to tempt a person to become a private patient. He found it difficult to understand what inducement there could be except the offer of better service, and such an offer would be in complete conflict with the white-paper. The Labour Party were much opposed to the buying and selling of practices. It should be made clear whether when a doctor went into the system and received a large addition of patients that addition would become a saleable asset. He hoped that the Goodenough Committee would lay down a standard so that the public could know what was a specialist and what was not.

Mr. GRAHAM WHITE (Lib., Birkenhead) cordially supported the proposals, which he said were very similar to those of the Liberal committee on the national health service. It was a remarkable thing that in the fifth year of a total world war the Commons should give two days' consideration to housing and health. No Minister had ever had a greater opportunity for public service. These things had more than domestic significance. We had shown what we could accomplish in the field of industry; but supremacy in the postwar world would be in political and moral leadership. He saw one omission: for the Central Health Services Council to be independent and effective it should, he thought, have the right to

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publish on its own account a report of matters on which it had tendered advice to the Minister.

Flight-Lieutenant H. V. RAIKES (C., Essex) thought the Government might have attained its purpose by merely extending the comprehensive medical service to dependants of insured persons. Some rich people would continue to pay their doctor not because he was doing any more for them but because they had always paid him reasonably in the past. Doctors would be in the position of taking tips from their private patients. The smaller voluntary hospitals would find their chief sources of income drying up; they could be taken over by the joint authorities and run as municipal hospitals. If private practice was made too difficult, the profession would attract men with mediocre minds searching for safety first. Members would get a big shock if they supposed that doctors who had been in the Services and under Government control for five years were going to jump into complete Government control for the rest of their lives.

Mr. A. G. WALKDEN (Lab., Bristol) regretted, and in this he was supported by Major B. E. P. LEIGHTON (C., Oswestry), the omission from the scheme of any arrangements for the rheumatoid class of diseases, responsible for ten times as much disablement as tuberculosis. Nor was there any mention in the white-paper of convalescent home treatment.

PARLIAMENTARY SECRETARY REPLIES

Miss HORSBRUGH, opening the second day's debate, said that every speaker but one had welcomed the scheme; many of the criticisms were not of the white-paper but of what was thought (or feared) might be in it. Questions had been asked about the composition of the health service councils, central and local; she said that they must, she thought, settle principles before filling in details. The first principle was that those concerned should have the best technical, professional and vocational advice. The second was that the machinery set up should not rob the scheme of proper democratic control—at the centre through health ministers responsible to Parliament, at the periphery through local authorities responsible to the electorate. The Government believed their proposals observed those principles. Mr. Storey had wondered whether the joint areas were large enough; would it not be better to divide England up into slices, as in Scotland? But there were fewer people in all five Scottish regions than in (say) Lancashire. The joint authorities in England, because of the larger populations served, could give a service impossible in the Scottish regions. For certain highly specialised services, such as cancer and neurosurgery, areas would be grouped.

One of the difficulties the Ministry had to face was that of finding the increased number of doctors required to work the service. General practitioners now numbered about 1 per 2000 of the population, but they were not evenly distributed. Consultants and specialists were far too few. Recruitment to the profession was on the increase, so that it averaged 1900 a year between 1937 and 1941; during the war admissions to the medical schools had averaged 2300 a year. But the shortage would not be as serious as in the teaching profession, because doctors had still been recruited and trained during the war, whereas teachers had not. Under the white-paper scheme no doctor was going to be directed. The doctor could set up a private practice anywhere he liked. He could, if accepted, do full-time public practice; or he could do part-time public and part-time private practice, his number of public patients being then rather less. But there might be some areas where there was a shortage of doctors in public practice, and that was where the difficulty came in. For example, if a young doctor applied to do part-time public and part-time private practice in Wakefield he might be told, "We are short of doctors in Wakefield; therefore we must ask you to do full-time public practice. There are many other places where there are openings for doctors who want to do part-time private and part-time public practice."

On the subject of health centres, it had been asked if these were to be of only one type—a communal surgery. The Ministry wanted experiments made with different types, so that in the course of years they would find what scheme was best. It might be a good thing to have some health centres attached to cottage hospitals, where there were beds and treatment could be given.

Dr. RUSSELL THOMAS asked whether the Minister, under the white-paper, could not establish health centres anywhere if he considered it in the public interest; and whether that did not mean that, in the course of time, every doctor would be a state salaried official.—Miss HORSBRUGH: The doctor can do part-time or full-time work. He can practise by himself, or in a group, or in a health centre.—Mr. MCGOVERN: Or he can retire.—Miss HORSBRUGH: Yes, he can retire, or he can leave the country and go to the Colonies or Dominions and see what their schemes are. He is perfectly free. There are many possibilities.

The Emergency Medical Service was the first attempt in this country to provide a hospital service, and it had proved its worth. It had brought the municipal and voluntary hospitals into a common service to provide the right treatment for the particular illness or injury, and yet each hospital had kept its identity. Miss Horsbrugh paid a tribute to the four ministers of health who had played a part in building up a hospital service. The new scheme aimed at bringing in all the hospitals in the same way—"It is not a question of bringing in the voluntary hospitals. The whole scheme is founded on the hospitals whatever they are, whether municipal or voluntary." The financial position of hospitals had not been clearly understood. There was to be a flat rate per bed, but in addition hospitals were to receive payment for services; these would vary from those provided by the first-class general hospital to those of the small cottage hospital, and the expenses incurred would be very different. The big hospitals required expensive equipment and had to meet a heavy outlay for upkeep and other charges. The white-paper had explained (page 23) that the hospitals would get a direct grant from the Exchequer on the flat-rate, and a payment for services rendered based on a tariff arranged centrally, which would fall on the local rates. Particular regard would have to be given to teaching hospitals. It had been pointed out that the new plan might mean the end of contributory schemes. It would be better to say that the hospitals having proved the contributory schemes a success, the Ministry was now making them universal and compulsory. The direct grant alone would more than reimburse the hospitals for the loss of contributions. There would be no need to chalk off at once the column of receipts "from grateful patients"; people would still be grateful.

Replying to Mr. MCNEIL, Miss HORSBRUGH said she could imagine that people would still want to pay into contributory schemes for one thing and another, and there might still be things for which they could pay. It remained for both sides to decide what those things were.—Dr. HADEN GUEST: But such things would include private wards for which people pay extra fees. That is a matter not only of confidence but of policy. What is the policy of the Government?—Miss HORSBRUGH: If the hon. member will look at the white-paper he will see it is quite clear that the hospitals, if they wish, can have paying beds. If we give good treatment in our hospitals, if we try to make the people comfortable, and feed them well and look after them well, surely that is the main point. They will receive that not by a payment at the time of treatment but by paying their contribution, and by what comes from rates and taxes towards this scheme.

Continuing, Miss Horsbrugh pointed out that the hospitals were there long before there was any contributory scheme. A voluntary hospital got, and would continue to get, contributions from individuals, not merely to provide free accommodation for themselves if they fell ill but because it was *their* hospital; they were interested in it and helped in its work. There would be Government inspection of both voluntary and municipal hospitals, to see that the proper standard was maintained. Under the EMS, patients were already accepted by both classes of hospitals under contract. Each area would have its hospital plan, made by the joint authority for the area in consultation with the local advisory committee; all hospitals would be included in the plan, and each would be asked to undertake particular work under a contract which it could accept or refuse. A voluntary hospital need not come into the plan, but in practice they would be pleased to come in. Arrangements for capital expenditure had yet to be settled.

Under the scheme it was hoped to go ahead with dealing with rheumatism. The Minister had already asked

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his medical advisory committee to see what further research could be made and how what is already known about rheumatic diseases could be coördinated. Convalescent treatment and rehabilitation would certainly be included in the scheme. These things had not been mentioned in the white-paper because it had to be kept to a readable length. The scheme would give doctors far greater opportunities than they had in the past for working out the best treatment for a particular disease and applying it at an earlier stage. Doctors would no longer be hampered by the patient's inability to pay. "We are going to give them the tools," said Miss Horsbrugh, "and I believe they will do the work better."

VIEWS FROM SCOTLAND

Mr. F. C. WATT (C., Edinburgh) could not find in the white-paper any guarantee that the voluntary hospitals would receive enough to keep them going. A block grant could have been created on the university principle, distributed from a central pool.

Mrs. A. HARDIE (Lab., Springburn) had been told that young doctors favoured the scheme and that it was the older men with established practices who objected to it. She had been on the Glasgow school board when medical treatment and inspection were first introduced; the doctors showed no willingness to come under the local authority, but when the bulk of them were made full-time medical officers the service soon became very popular. Once the white-paper scheme was in force the doctors would find that working under a local authority was not a bad thing. She could not believe that because a doctor obtained security he would go slack.

Major E. G. LLOYD (C., Renfrew) suspected that the wording of the white-paper had been largely influenced by the organisation called PEP. He feared that the central and local advisory bodies would be ignored; the executive authorities need not accept their advice at all. These bodies should be allowed to publish an annual report free from ministerial or departmental censorship. There was a grand opportunity in the bill to improve the status and conditions of nurses. He hoped that the mental hospitals would be brought into the scheme and treated with the same consideration as the great voluntary hospitals.

Mr. H. MCNEIL (Lab., Greenock) paid tribute to the value of the PEP report on British hospitals, Mr. K. LINDSAY (N. Lab., Kilmarnock) interjecting that it was largely doctors who worked on it for three years to get the facts. Mr. McNeil thought that the health centres would offer a great opportunity for developing group education on health matters.

Commander T. D. GALBRAITH (C., Glasgow) maintained that it was not the doctor who competed for patients in a health centre but the patients who would compete for the doctor who showed particular sympathy or skill. The only resonable way to pay the health-centre doctors would be by capitation fee or combination of this and salary. For part-time service doctors the only criterion should be: Is the doctor conducting his public practice efficiently? If he was, the number of his private patients should be left to his own discrimination.

Mr. W. GALLACHER (Comm., Fife) was sure that Scotland wanted the scheme. It should be made clear to the doctors and nurses brought in that they were going to get a remuneration that would not be less and might be more than the general average of the fee-grabbing practitioner.

Mr. G. MATHERS (Lab., Linlithgow) thought the voluntary hospitals were public-spirited enough to want to come into the scheme.

SCOTTISH SECRETARY REPLIES

Mr. T. JOHNSTON began by emphasising the present disparities between the benefits provided under the NHI by different approved societies. One could pay out 28*s.* a week in sickness benefit, with generous supplementary benefits, against the statutory 18*s.*, whereas others could only just pay the statutory benefit. Sickness payments were eight times heavier in one society than in its neighbours. At present 12% of all men and 18% of all women draw no more than the minimum statutory benefits. There was a similar disparity in the distribution of general practitioners. In Hastings before the war there was 1 per 1178 persons, compared with 1 per 4105 in South Shields. The spa or bath-chair type of area was liberally served. Diagnostic facilities were scarcely available to the average practitioner. Since the war they had been experimenting in Scotland with the "Supplementary Medical Service Scheme," under which cases difficult to diagnose were sent by practitioners to the regional medical officer, whence they were referred to specialist, hospital or convalescent home, or were found more suitable work. They had also experimented with rehabilitation among injured colliers at Gleneagles, and with success. For the last 30 years all the North of Scotland had been covered by the Highlands and Islands service, in which the doctor was paid partly by salary from state and local authority, to a smaller extent through the NHI fund and partly from private practice. There was no prohibition from charging fees to wealthy people who came for the deer-shooting. (A hon. Member: "Fleecing the rich.") The selling of practices was a degrading system. It would be essential to ensure that the public service did not suffer in quantity or quality because of the doctor's private commitments or other public engagements. There had been no evidence of any such conflict in the H & I scheme. There was no possibility, even if they desired, of stopping all private practice; it had not been attempted anywhere in the world, even in Russia. In New Zealand only 16 doctors were now on a salaried basis, and they were allowed to charge fees for accidents and emergencies outside their areas. The essence of the white-paper proposals was that every doctor should be allowed to opt as he chose, so that if it was right to say that a majority of doctors were hostile to the scheme that would easily and quickly be demonstrated.

Before the war about a quarter of the voluntary hospitals in the British Isles were run with a deficit. It was undignified for a great nation to provide for its hospital services partly by flag-days. After the war rich benefactors would not be so numerous, and costs of administration, nursing staffs, building and equipment would be heavier. Thousands of people would feel that their heavy social-security payments should cover hospital contributions. The 7 large base hospitals in Scotland had treated some 26,000 patients from the waiting-lists of the voluntary hospitals during the war, and there had been no ill-will or antagonism. He prophesied that the overwhelming majority of voluntary hospitals would come gladly into the scheme.

In the House of Lords

LORD WOOLTON COMMENDS

In the House of Lords on March 16 Lord WOOLTON, Minister of Reconstruction, moved:

> That this House welcomes the intention of His Majesty's Government declared in the white-paper presented to Parliament to establish a Comprehensive National Health Service.

The Government, he said, had tried to work out a scheme of common insurance to secure for our people freedom—so far as possible—from the misery and the economic consequences of failure of health. This was not a scheme for relief; it invited the whole community to join in an effort to ensure for every individual a positive opportunity for good health in so far as that could be provided by the skill and knowledge of the medical profession. It was not a "free" scheme; but the method of paying for the medical and health services would change—all would pay for the service of all. The use of voluntary hospitals was essential to achieve a complete medical service in the immediate future, and they would be paid for their services—not like paupers according to their need, but like partners according to the help they gave. Voluntary hospitals would still need the support of all those who wished them to continue their work as autonomous institutions, and he was sure they would get it. The medical profession could not be regimented, and experience of the new health centres would have to be gained by the method of trial and error.

LORD MORAN REGRETS

Lord MORAN moved an amendment to add at the end of the motion the words:

> "... but regrets the absence of sufficient detail on many important matters, in particular on the consultant service, to enable the House to give a considered judgment."

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The aims of the white-paper, he said, were unexceptionable; they had been advocated for many years by the medical profession itself. What mattered were not the aims of the Government but the means taken to fulfil them. The medical service had been spoken of as being comprehensive; but there was not one single service—there were to be six, under various Government departments as at present. Lord Moran recalled the misgivings expressed by doctors asked to serve on advisory committees to Government departments. He was on one such committee which did not meet for two years, and there was another which had no meetings in three years. As the secretary of the British Medical Association recently said: "Many are chosen, but few are called." It was misleading to the public when the impression was given that a Minister was receiving advice from prominent members of the profession.

In the preliminary discussions with the Minister of Health, the committee representing the profession asked that the Central Advisory Council should be a statutory body. That had been conceded. They also asked that it should elect its own chairman, and this had been conceded. Two further and much more important assurances were asked for—namely, that the council should be allowed to publish its own proceedings, and that it should be elected by the profession and organisations representing the profession, and not be nominated by the Minister. In the Representative Committee they had been under the impression that these safeguards had been conceded, and they were disappointed to find that the Ministry had since repented of its own temerity.

At the meetings he was impressed by the general desire of all sections of the profession to find some alternative to the Ministry of Health to guide their destinies. It was not a healthy sign when the profession took that attitude. The present Minister could do much to end the present state of affairs by infusing a different spirit into the relations between his Department and the profession. If he trusted the profession he would never regret it.

The functions of the Central Medical Board were very unusual. By a process of negative pressure it would be able to direct doctors where they should go and work. That might be reasonable; it might even be necessary—but it was a new proceeding. Lord Moran hoped appeal machinery would be provided in cases where there might be hardship. More startling was the proposal that the Board should have the power to direct new entrants to the profession into full-time work in the Service. Did the Government intend to apply similar powers to every other section of the community? This would continue in peace-time powers of conscription which the Government had over everybody in war-time. If a body was to exercise such powers, it would have to have the confidence of the whole profession. That meant that a proportion of its membership should be elected by the profession. The functions of the Central Medical Board were more controversial than all the rest of the white-paper proposals put together. The new power asked for was looked upon with grave suspicion in the profession.

The county and county-borough councils had been combined into a joint authority, and what this left to the councils could be termed the small change of medical services—sanitation and the like. The life of medical officers already serving these councils would be dried up, and their incentive taken away. What the Government failed to consider was what would be the effect on recruiting for this very imporant branch of the medical profession—the effect of desiccating it in this way of all real use. How was the voice of the profession to be heard locally? It was true that there was to be a local health service council, but he did not think it would have very great power. If half a dozen members of that health service council were allowed to serve on the joint board, not necessarily with voting powers, they would bring technical advice to it which would greatly reinforce the medical officers of health. He considered this most important.

The general practitioner would work either in a separate practice or at a health centre. There was good reason for believing that doctors who qualified after the war would prefer to go to work at a health centre because they would not have to buy a practice; similarly very few of those returning from the war would have money for that purpose. The Central Medical Board would be able to attract doctors towards the health centres and before very long the great majority of the younger generation would be working at health centres on a salary. They would thus be removed into a service where their reward would bear very little relation to their success in their profession. Very many of them would find themselves in a service in which there was no promotion and little incentive. It would be advisable to keep these men on their toes by letting them have, in addition to their basic salary, a capitation fee: or alternatively they might be remunerated for doing child-welfare or maternity work, or other work for which their special qualifications fitted them.

The health centre woulds have three functions: there would be places where doctors worked, places where healthy persons could be periodically examined, and public community centres, such as Peckham Centre, where people would have rest and recreation. He did not think that either the profession as a whole, or the public, were yet prepared to welcome these health centres, but he believed they provided opportunities for work for the practitioner that had never existed before and would make for greater efficiency. He congratulated the Minister on resisting criticism and going on with this experiment, in which there was much hope for the future.

He had found very little in the white-paper about the consultant services, 1¼ pages out of 50, and that was largely pious aspirations with hardly any details at all. To bring out a plan of a comprehensive medical service without details of these services was very much like asking the House to pronounce judgment on an aeroplane without being told what engine was being put into it. It was hard to understand the Ministry's lack of interest in the consultants. It was common knowledge that there were not enough consultants in England at the present time. The Ministry seemed to forget that it took years to train a consultant, and if they were to have any kind of a service in ten years' time, it was necessary for medical schools to start training consultants now. Yet how could they ask them to do this without knowing how many they had to train? A list of consultants in England was needed, and when the Ministry had at last asked the Royal Colleges to prepare such a list, there were delays of several months, and though it was vital for the deans of medical schools to have the information as soon as possible, we were told that it was only for the Minister's private eye.

These consultant services must be taken seriously. We were told, for instance, that they were to be put under hospitals. Surely, if there were arguments that the general practitioners should be under a central body, then they were twice as strong for putting consultants under a central body. He would like to see the Central Medical Board split into two sections, one for the general practitioners and the other for the consultants and specialists.

When he looked at the white-paper's references to voluntary hospitals he thought they were very friendly; but obituary notices were intended to be friendly. They would lose at once half the income which came from various directions. What would replace it? For many years the best brains in the medical profession had given all they could to the voluntary hospitals, and they had done so with complete freedom. In many municipal hospitals it was still necessary for a doctor to ask permission before he could send a medical contribution to a medical journal. "I cannot but wonder whether the type of man who has made the good name of the voluntary hospitals will continue to come into the profession if our very professional thoughts are to be censored." The London County Council had done great work in their municipal institutions, but they could not work miracles. To bring these institutions up to the standard of the great voluntary hospitals was a matter of many years' effort, and he hoped the voluntary hospitals would not be allowed to die from want until there was something equally efficient to take their place.

There was hardly an important statement in the white-paper which was not qualified by a "might" or a "may." This might be very adroit, but perhaps not desirable in setting forth the charter of a great profession. Many doctors were asking questions today to which there was no

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immediate answer. In recent years much of the interest had been taken out of the life of the general practitioner, and men worth their salt did not like parting with responsibility. He believed unless they found some way of bringing the ablest and keenest practitioners into the work then the type of man entering medicine would deteriorate. Changes foreshadowed in the white-paper seemed to strike at the general practitioner as an individual. What they would have to remember was that the medical student of today could make or mar the medical services of tomorrow.

HOSPITALS AND PROFESSION

Lord NATHAN said that many voluntary hospitals were great teaching institutions with a world reputation and a long tradition of skill and professional freedom. Some were obviously too small, badly housed and poorly equipped, and these ought either to go out of existence or be stepped up. He thought that what was remarkable was not that the municipal hospitals were not better, but that they were as good as they were. In their comparatively short history they had not had the opportunity to bring themselves into line with modern practice and tradition to the same extent as the voluntary hospitals. It was inevitable for a long time to come that voluntary hospitals must play a vital part. There was a strong case in logic for making them public; and a strong case for keeping them voluntary and within limits free; but there were no grounds for keeping them voluntary and free—as the white-paper postulated—without securing that they would be able to continue the voluntary contributions which alone enabled them to be free. It would not be sufficient to fill the gap if voluntary hospitals had to depend solely on the goodwill and the charity of the benevolently-minded; contributory schemes had become a vital element in their maintenance.

He thought it was a pity that the distinction between the fee-paying patient and the panel patient and their treatment should continue. For many people it would be a fiction to say that they had a free choice of doctor and a guarantee of the best treatment. But he agreed that a complete public service was neither politically nor practically possible. He was willing to accept a mixed service as a compromise, on one overriding condition—namely, that the private service did not reduce the quality, or restrict the facilities, of the public service. If the fee-paying patients took all the cream, the scheme would turn out a sham. There must be sufficient public control to see that the public got what had been promised. Doctors, while free professionally, must be administratively under orders. He saw no reason why representatives of the medical profession and of the voluntary hospitals should not be coöpted on to the joint boards.

Viscount SAMUEL said that the problem of voluntary hospitals and other organisations could be dealt with in three ways: (1) they could be superseded and an entirely different system established; (2) they could be left in full vigour and efficiency; or (3) they could be allowed to survive but maimed. Nothing could be worse than the third alternative.

LORD DAWSON'S CRITICISMS

Viscount DAWSON of PENN said that the white-paper was in itself a bold effort, reasonable in its unfolding, and attractive reading. But the scheme tried to go too far; it embraced too much. The sensible thing would have been to take the foundations first and leave the superstructure to be built later in the light of experience rather than in the light of speculation.

There was nothing new in group practice. Why the enthusiasm to push the health centre for the purpose of group practice? It was, he thought, a way of insidiously introducing the principle of the whole-time salaried service. He was not saying that salaried service was not right for certain departments of medicine; indeed, he thought it likely in the future, in any case, that doctors as a whole would draw a larger proportion of their earnings from salary than from fees. But that was far from saying that the new medical service was to be forced into a particular mould—that, sooner or later, the medical service must be universally whole-time. "I can see nothing but disaster for the best type of medicine if any service were universally whole-time."

The medical profession was particularly difficult to regulate, not because of the men in it, but because of the nature of its work. The white-paper realised that with admirable fairness. A sick man was an individualist; the doctor who looked after him also became an individualist; and individualism was resistant to restraint.

The only way in which a large profession, with all its technicalities, could be administered was to put at the right hand of every administrative body a vocational body with powers to advise and guide its policy. They had to watch carefully that at every level such a vocational body had real power. The Central Services Council, which was to advise the Minister, should have at least half its members freely elected by the profession; whereas the white-paper proposed that it should be nominated entirely by the Minister. There was no body more in danger of becoming bureaucratic than the Central Medical Board. It would be easy enough to start with an independent medical service, but he was not so sure that its independence would continue. Once they got the medical profession under the control of the Civil Service, it was good-bye to the best that medicine could do.

The real foundation of the whole scheme was the hospital and allied services. That was something that could be got on with quickly. The only way health and hospital services could be got on with was by bringing the two sets of hospitals together, as had been advocated by the medical profession for years. The areas proposed were not big enough. They must be large enough to embrace every type of hospital and clinic, interconnected one with the other, with a key hospital, wherever possible, at the top. If there were as many as 40 areas, how could one get a really efficient service for any one of them? Each of the joint medical authorities should have at its right hand a medical service council which would consist, not only of doctors and representatives of voluntary hospitals and other ancillary services, but it must be made quite clear that the joint authority was obliged to listen to, and even ask for, advice before any major question was settled.

Voluntary hospitals did not need to stand on sentiment; they had the admiration and affection of a large part of the population. They were a dominant part of the hospital services, and it would be crass folly to attempt the new comprehensive health service without these hospitals. They should be as free from financial anxiety as the local authorities' hospitals. But the moment the new service started it would take the ground from underneath the contributors' feet. Was it to be supposed that the voluntary hospitals would receive the same amount of charity as they did before? There should be no hesitation in making them secure.

The idea of health centres was originated in 1920 by a body of which he was chairman. They were looked on as the outpost of the hospital system, enabling the general practitioner access to all the facilities of an institution on a small scale. They were the means by which preventive and curative medicine could be brought into actual contact—a communal clinic where practitioners could use all the services they needed. The Ministry had forgotten something important—the provision of beds for general practitioners' patients. Doctors in separate practice, or in small partnerships, or in group practice, should all have equal access to the health centre. What caused him disquiet was that the white-paper went out of its way to extol health centres for group practice without thought for the single practitioner or the smaller partnerships. Too often there popped up in the white-paper what Lord Hewart described years ago as "the new despotism." He thought that in times of peace to direct a doctor where and how he was to practise was nothing but authoritarianism. Therefore they had to be on their guard against regimentation, against being made stereotyped. Doctors agreed that a comprehensive service was necessary, for they had already advocated it; but it must be free-minded, flexible and professionally guided. They wanted to preserve their great tradition and hand it down with its freedom to generations which followed them.

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THE VOLUNTARY HOSPITALS

Lord LUKE said that the voluntary hospitals had given the white-paper a reasonable welcome, and were willing to help with suggestions as to how they were to participate in the scheme and yet retain their independence. The Government were anxious to give them a choice, but on closer study it appeared to be Hobson's choice. If they participated in the scheme, or even if they did not, their means of raising income was taken from them. He hoped it might be possible to continue contributory schemes within the framework of the insurance contributions—a sort of earmarked insurance. With all their experience, he regretted there was no representation of the voluntary hospitals on the bodies which would order the new scheme. Although the voluntary hospitals had expected a full partnership, they had not got it. They were now the senior service, but they were to become the junior service of the future. He urged that there should be a central hospital board, analogous to the Central Medical Board, and there should be joint local boards of local authority and voluntary hospitals. This was the only form of partnership in the hospital service which could be a success. All hospitals should be equal in status and representation,

Lord GREVILLE agreed that voluntary hospitals were going to take a secondary place. They were going to be put in the position of being allowed to exist just as long as the local authority pleased, and then to be told "We have learned all we want to learn; good-bye!" This problem of partnership should be thoroughly thrashed out. If it was going to be a full partnership, they would be a great deal happier, because no hospital wished to come under bureaucratic or political control. They had learned during this war how bureaucracy had gripped the voluntary hospitals—forms, returns, masses of correspondence with Government Departments, getting involved in masses of red tape. They did not know what was going to be given for work or for expenses under the new scheme; but they did know they would lose very large sums of money.

The debate was adjourned till the next series of sittings, when Lord Horder will be the opening speaker.

MALNUTRITION IN OCCUPIED COUNTRIES

In the House of Lords on March 15 the Archbishop of CANTERBURY asked the Government whether they had any information to give concerning the supply of food for the peoples of enemy-occupied countries, particularly Greece and Belgium, where malnutrition was grievous. There was a prospect that in the future a fully-nourished and vigorous German nation would be surrounded by neighbours whose physical vigour, and perhaps nervous stability, had been undermined by malnutrition. He was assured that there was sufficient neutral shipping to send vitamins and dried milk to the occupied countries.

Lord HORDER said that medicine could not throw light on famine—famine either killed or was relieved. Prolonged under-nourishment was a more serious problem, because it led to diseases of low resistance, and its effects might only be remedied in the third generation. Lord Horder had evidence of the existence of malnutrition from three good sources: clinical examination of refugees in Lisbon; the value in terms of nutrition of the basic daily ration in occupied countries; and reliable reports of conditions in those countries. The Lisbon refugees were relatively few in number, and were certainly not among the least robust of the citizens of the countries from which they had escaped, but as lately as August of last year even they showed evidence of prolonged malnutrition. Last September the basic daily ration in Belgium was about 1260 calories, whereas most medical authorities agreed that a minimum of 2480 calories were needed. In France the calorie value at the end of 1943 was only about 1080. Children in Belgium got supplements up to the age of six. Adolescents were suffering from want of proper nourishment. Prof. C. Heymans of the University of Ghent had reported that in Belgium adults had lost 20–30 lb. in weight. Pregnant women showed a drop of 80% in the normal weight gain which should occur, and infants at birth had shown an average drop in weight of 2·2 lb. Students, nurses and hospital personnel also showed signs of malnutrition. Tuberculosis was a good measure of the state of nutrition. The number of people in Belgium receiving the supplementary ration on account of that disease rose from 70,000 in December, 1941 to 110,000 in February, 1943. Galloping consumption, which had been uncommon for two generations, was today a common experience in Belgium, France and Greece. Lord Horder believed the facts he had given to the House to be true, and as a humanist he was compelled to join with the Archbishop of Canterbury in his appeal to the Government.

The Earl of SELBORNE, Minister of Economic Warfare, affirmed that in applying the blockade we had endeavoured to mitigate its impact on our unfortunate Allies in every way we could. We had facilitated imports of food through neutral countries within the blockade area, and had taken vitamin D off the contraband list. We had also made it plain in neutral countries that if they received children and other refugees from occupied countries Great Britain would take no objection to these neutral countries importing more food. He produced official Belgian figures, which he had no reason to think were faked, showing that the death-rate was little, if any, higher than before the outbreak of war. The figures for infantile mortality in Belgium, while higher than those recorded immediately before the war, were better than those of twenty years ago. Hunger was by no means the worst condition that prevailed in Europe today, Lord Selborne concluded; let us beware that in trying to save the health of the young people in occupied territories we do not prolong the horrors to which they are subject.

QUESTION TIME

Ingredients of National Loaf

Apart from yeast, salt and various improvers which are the recognised adjuncts of bread-baking, the National Loaf is made from National Flour which is milled from a grist of 97½% wheat and 2½% barley or rye. Imported white flour is mixed in at the rate of 10%, and other authorised additions are calcium at the rate of 7 oz. per 280 lb. of flour, and dried milk at the rate of 2 lb. per 280 lb. of flour. In addition, the baker may use potatoes, potato flour and fat as permitted in the Bread (Control and Maximum Prices) Order, 1943. The use of barley for dilution is ceasing very shortly. (Colonel J. J. LLEWELLIN replying to Sir E. GRAHAM-LITTLE.)

Sanatorium Waiting Lists

In answer to a question Mr. H. WILLINK stated that at Dec. 31, 1943, the numbers of tuberculosis cases awaiting institutional treatment provided by tuberculosis authorities in England and Wales were 529 children and 2752 adults, of which 233 children and 189 adults were non-pulmonary cases.

Venereal Disease among the Troops

Mr. SORENSEN asked the Secretary of State for War if he would state the approximate percentage of men who had been treated for venereal disease in this war or the approximate percentate of decrease compared with the last war; what percentage had been discharged from the forces because of venereal disease; and whe ther he was satisfied that all possible steps had been taken to reduce the incidence of this disease.—Replying to a question Sir JAMES GRIGG stated: In the years 1940 to 1943 inclusive, there were in this country on the average just under 11 fresh cases a year of venereal disease per 1000 troops. Of the total number of men discharged from the Army on medical grounds 3 per 1000 were discharged on account of venereal disease.

Opium Traffic

In reply to a question Mr. O. PEAKE, under secretary to the Home Office, said that the number of convictions for offences in regard to opium in 1934, 1939 and 1943 was respectively 40, 13 and 149. Of these 7, 4 and 135 were recorded at Liverpool.

BIRMINGHAM COURSE ON INDUSTRIAL MEDICINE.—Six lectures on industrial medicine will be held at the medical school of the Birmingham Hospitals Centre at 4 PM on Wednesdays and Thursdays, April 5 and 6, 12 and 13, and 19 and 20. Dr. Halliday Sutherland will speak on tuberculosis in industry; Dr. Donald Hunter on the education of doctors for industry and on the prevention of disease in industry; and Dr. Donald Stewart on factory hygiene. Further information from the secretary of the University, Edmund Street, Birmingham.

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Letters to the Editor

HAZARDS IN THE TREATMENT OF VARICOSE VEINS

SIR,—I venture a brief comment on the major points in your interesting leading article of March 11. My own experience does not go all the way in step with your untrammelled confidence that "results of ligature and injection are particularly happy and curative." Merchant seamen trying to sign on for a voyage are sometimes turned down because of varicose veins, and come to a hospital such as this, placed handy for them, for cure. The cases are well developed, for early slight varicose veins usually pass the doctor. The hazard of failure to cure has often had to be faced here by the seaman's being again rejected for varicose veins, and seeking our aid—in most cases the failure has been ours. Many have also returned for re-examination 9 to 18 months after treatment. To make these two sorts of follow-up more instinctive, I have in many cases carried out a different procedure for each leg, where both legs presented varicose veins. It has therefore not been difficult in the course of years to form a judgment, and I think accurately, on the curative merits of various treatments in my hands.

The standard treatment used to be excision of lengths of the vein (long wounds and many sutures!) between fossa ovalis and malleolus, these lengths being selected and indelibly marked in the standing patient before operation. Unless this preoperative marking was done, operation was at best a partial success; it was notable also that the smaller the gaps between excised lengths the better the result—best of all was the result of many short excisions (and wounds!) with small gaps in between, and especially so in the lower third of the thigh and the upper three-quarters of the lower leg, where the varicose vein's inlet and outlet anastomoses with the deep veins, and with superficial collateral veins, mostly occur. This method gave a high measure of success, but its surgical severity with attendant anxieties, and the time spent in convalescence, made it highly objectionable; so that, when it came, "sclerosing" injection was welcomed over-eagerly. Its early promise did not withstand many re-examinations 9 months or so after injection.

A series of trials was then begun, using, whenever the chance presented, a different method for each leg in the same patient—for example, division and ligature at fossa ovalis and injection below, compared with several divisions and ligature in thigh, and later in thigh and lower leg, accompanied by injection. In all cases immediate postoperative treatment was ambulatory.

Thus, injection being a constant, it became clear that most success followed multiple divisions. Finally, ligature-divisions and injection was compared with even more numerous divisions of vein in thigh and lower leg with no accompanying injection. The last method was decidedly more successful; it was safer, for two cases of pulmonary embolism were noted in the ligature-division and injection series, one of these being fatal after 3 months' invalidism; and patients who suffered both treatments expressed a strong dislike of injection on the score of pain and walking disability for days after operation.

All injection has now been abandoned. In the last series of over 700 legs to date the method has been division of the varicose veins at many sites carefully chosen by finger and eye in the standing patient, and indelibly marked, at a convenient time before operation. In those regions of most anastomoses noted above these points for venesection should not be more than 1½ inches apart along the course of the veins; the incisions need seldom be more than ½ inch in length, and if made along the natural lines of cleavage of the skin (Lange's lines) do not gape and need no suturing; moreover, very few ligatures are necessary, often only the one at fossa ovalis. Cosmetic and curative results are very good and all but a few patients are fit for full work again 3 weeks after operation.

Those are the facts of clinical experience over many years. They could be foretold by the findings of morbid anatomy. Some years ago, after injecting quinine and urethane sclerosing solution into varicose veins in selected male patients, I dissected out portions of the injected veins at intervals of time, and was fortunate to observe by naked eye and microscopically that obliteration of the vein occurred only if phlebitis and periphlebitis had been intensive and extensive enough to cause thrombosis-necrosis of the vasa vasorum, including especially the nutrient artery twig, and that a complete cross-section of the vein must be so affected. Sclerosing fibrosis happened only when continuity of vein was completely breached by circumferential necrosis of its wall. Sclerosing injection was in fact necrosing injection, and its success depended on doing by an unpredictable and uncontrollable necrosis what the surgeon could do surely, controllably, with much less danger and far less pain, with a scalpel.

Royal Albert Dock Hospital. H. M. HANSCHELL.

SLIDING GRAFT FOR TIBIAL FRACTURE

SIR,—The experience gained in a similar type of orthopædic unit to that of Burns and Michaelis may form an interesting addition to the figures quoted in their article of March 11. We agree that sliding-inlay tibial bone-grafts are most satisfactory; 18 grafts of this sort have been done, 11 for compound and 7 for simple fractures. In the compound cases the average time between injury and operation was 89·9 weeks. The longest interval was 6½ years and the shortest 17 weeks. Union occurred in an average of 16·4 weeks. In the simple cases the operation was done for minor degrees of delay in union. The time between injury and operation averaged 12·9 weeks and union occurred in 12·3 weeks; 15 weeks was the longest recorded. Union was said to be firm when unprotected weight-bearing produced no ill effects. We have not used vitallium screw fixation as a routine; 8 of our cases had no such fixation, as the grafts were able to be set solidly in their grooves. We have been rather in favour of fixing one end only of the graft with a screw and locking the other just below the cortex. We had one failure which we considered was due to operating too soon after a cross leg skin-graft.

Such operations seem to have a special place in hastening union in cases showing delay at about 12 weeks. Solid union after a further 3–4 months can be guaranteed. It is therefore unnecessary to investigate the truth of the dictum that all simple fractures of the tibia unite after immobilisation for 6, 9 or even 12 months.

Basingstoke. V. H. ELLIS.

DANGERS OF TRILENE ANÆSTHESIA

SIR,—Dr. Hunter, in his article of March 4, has misquoted my paper on delayed recovery after 'Trilene' anæsthesia. It contained no reference to "mental confusion," nor was any such condition apparent in the cases I recorded. These were purely cases of delayed recovery, due, as I indicated, to a too heavy maintenance dose of trilene. I now recognise this complication as one of my "teething troubles" with a new agent, and since taking greater care to keep the maintenance dose at a minimum I have had no further recurrence of this complication, although patients who have required a greater maintenance dose than usual sometimes complain of a heaviness which may persist for 12 hours or so. Dr. Hunter suggests that the delayed recovery may be due to the combination of 'Pentothal' and trilene, but in the many hundreds of administrations of trilene that I have made since the publication of my article I have preceded each with pentothal, in undiminished dosage, and have had no further examples of delayed recovery.

My experience with trilene—it is now extensive—has led me to regard it as one of the best agents we have for the production and maintenance of a light plane of anæsthesia in adults. I have found it unsuitable for young children in whom it nearly always precipitates gross tachypnœa. Induction with pentothal seems to afford protection from this complication, for I am rarely troubled with it in my adult cases. I have found trilene an excellent agent, given on an open mask, for the production of analgesia in babies and young infants. Occasionally during trilene anæsthesia I have observed cyanosis in spite of high oxygenation and good respiratory excursion. I can only presume that the trilene precipitates bronchial spasm; this is supported by the

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fact that the cyanosis is immediately relieved by a change to ether and that a bright colour can then be maintained with less oxygen. The tachypnœa precipitated by trilene may also originate in bronchial spasm; the protection afforded by pentothal would then be explained, since Lundy recommends pentothal for the treatment of asthma. The respiratory disturbances occasioned by trilene might in part be due to the density of trilene vapour; it would be interesting to know if they could be eliminated by the use of a helium-oxygen mixture.

The other complications of trilene anæsthesia, with the exception of the toxic reactions occasioned by its use in a closed circuit, are mainly due to too great a concentration and can be eliminated by restricting the use of trilene to the production of first or, at the most, light second plane anæsthesia, with the proviso that the maintenance dose in long administrations must be kept at a minimum. That trilene, like cyclopropane, is vagotonic is to its advantage and need not cause any alarm, provided that the vagotonia is kept within safe bounds, as it will be by the careful administrator. Increased vagal tone decreases the liability to postoperative distension of the bowel and provides the surgeon with conditions inside the abdomen similar to those seen in spinal anæsthesia. There is less tendency to loss of fluid by sweating and less depletion of liver glycogen. Bradycardia, controlled to the maintenance of the normal pulse-rate, preserves cardiac efficiency by assuring the normal diastolic rest.

Apart from delayed recovery, I have observed practically no unpleasant after-effects from trilene. Vomiting is rare, never excessive and certainly less than that produced by other volatile agents; in this respect I have found trilene superior to cyclopropane, which causes a troublesome nausea after prolonged administration. Convulsions have been recorded during anæsthesia with almost every agent, including local anæsthesia; we do not know their cause, and it is unfair to cite them as a complication of trilene anæsthesia in contradistinction to other agents. As an adjuvant to nitrous oxide I do not know of any better agent, particularly in obstetrics, and I fail to see why Dr. Hunter considers the use of trilene to facilitate the introduction of ether a dangerous proceeding. 'Vinesthene' I would place second to trilene. Owing to its extreme volatility vinesthene is not suited to anything but a closed circuit; it is in short supply, expensive and wasteful in use, inflammable and explosive and often causes annoying salivation. Nor do I agree with Dr. Hunter that pentothal is safer than trilene.

It would be a pity if so useful and safe an agent as trilene were to be discredited by alarmist reports. Its use in a closed circuit must clearly be discontinued, after the cases of brain and nerve damage described in your annotation of March 18, and special care must be exercised to avoid trilene contamination of closed-circuit apparatus before it is used for other anæsthetics, but since the toxic agent is produced by the reaction between trilene and soda lime this unfortunate experience should not deter us from using the drug by open methods.

Bournemouth. S. F. DURRANS.

*** The manufacturers of 'Trilene,' IC (Pharmaceuticals) Ltd., have confirmed the findings of Humphrey and McClelland and Carden (*Brit. med. J.* March 4, 1944, pp. 315 and 319), that dichloracetylene is liable to be formed when trilene is used in a closed circuit with soda lime. A warning notice to this effect is now printed on all packages, &c.—ED. L.

ASEPTIC CAVERNOUS SINUS THROMBOSIS

SIR,—I would like to suggest a possible explanation of the unusual case reported by Le Marquand and Recordon in the *Lancet* of Feb. 19. The outstanding clinical features of the case seem to be the simultaneous infection of both cavernous sinuses; the deep midfrontal site of the headache; and the interval of 7 days between the injury and the onset of a streptococcal pharyngitis. These features, in conjunction with the hæmorrhage into the central retinal area, suggest that the eyeball may have been driven backwards and slightly medially on to the posterior part of the lamina papyracea of the ethmoid—probably causing a small fracture of the thin plate of bone which separates the orbit from the posterior ethmoidal air cells or possibly of the lateral part of the anterior wall of the sphenoidal air sinus. The resulting hæmorrhage, whether or no an actual fracture occurred, would form a suitable environment for the lighting up of a pre-existing dormant focus of hæmolytic streptococci. The active infection thus produced showed itself first in the pharynx, and at the same time an infection of the sphenoidal air sinus was taking its course. As it is possible for the sphenoidal air sinus to be so asymmetrical as to allow sphenoidal sinusitis to affect the nerves in the cavernous sinus of the opposite side (Logan Turner, *Diseases of the Nose, Throat and Ear*), it is not necessary to postulate a double sphenoidal infection in order to get a double cavernous sinus thrombosis. In fact it would be easier to account for the double infection by a spread along the intercavernous sinus, although one side might be expected to develop before the other in this case.

In an acute infection such as I visualise I would not expect to find any radiological changes, nor would I expect to find any changes during convalescence after such a favourable and dramatic response to treatment.

If this explanation is accepted it seems likely that the course of sulphapyridine given for the pharyngitis was a valuable prophylactic factor, contributing to the successful termination of the case.

Northwood, Middlesex. L. J. PANTING.

CHLORIDE OR CHLORATE

SIR,—I have just noticed a regrettable mistake in my letter on the estimation of circulation-time which appeared in your issue of Feb. 26. Calcium *chlorate* should read calcium *chloride*. I do not know whether the chlorate can be given intravenously, nor what the effects would be.

Stratford-on-Avon. MAX WINTERNITZ.

*** In Continental usage chlorate means what we call chloride. Calcium chloratum, for instance, is the common $CaCl_2$; the uncommon $Ca(ClO_3)_2$ would be written calcium chloricum. Dispensers no doubt are alive to this source of ambiguity.—ED. L.

RCS COUNCIL ELECTION

SIR,—I have received a circular from the President, Royal College of Surgeons of England, concerning an election to the council, wherein it is stated that it is of "paramount importance that the council should be largely representative of the medical schools and of the surgical profession throughout the country." The present council consists solely of representatives of the medical schools; the non-teaching voluntary and municipal hospitals wherein the bulk of the fellows work are unrepresented. As far as my memory serves, my old chief, Robert Hogarth of Nottingham, was the only surgeon attached to a non-teaching hospital who has been on the council in several decades. I have no knowledge as to any nominations that may be made but I consider that it is time that some members of the council were men other than those associated with the teaching hospitals. I hope therefore that many fellows will nominate and vote for men who are not attached to the teaching schools, so that the representation on the council shall become a wider one.

Halifax General Hospital. H. I. DEITCH.

SAUCE FOR THE GANDER

SIR,—I am informed that a famous KC is planning a salaried state medical service in which doctors will be able to work only for the health of their patients, without thought of fee. May I suggest that the compliment could be returned—that a famous physician might be asked to plan a salaried state legal service in which lawyers (solicitors, barristers, and KCs all) might have the privilege of serving only Justice, without thought of fee? Thus not only could the Citadel be reduced, but the Temple might be purged. A. NELSON-JONES.

*** Our legal correspondent writes: "While the lawyers cannot claim that their altruistic services are as readily given or as widely organised as those of the doctors, the legal interests of "poor persons" have for a long time been cared for, particularly in defences to criminal charges and in the divorce courts. If, as seems likely, your correspondent has in mind the present Minister of Health, Mr. Willink's record of social service is not one of which any professional man need be ashamed."—ED. L.

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Obituary

HORACE GEORGE TURNEY

OBE, DM OXFD, FRCP, FRCS

Dr. Turney gave long and valuable service to St. Thomas's Hospital. Entering as a student in 1884, he at once showed his prowess by becoming an unfailing prize-winner. After qualification he held the offices of house-physician and house-surgeon—taking the FRCS in his stride—and was resident assistant physician from 1891 to 1893. In those days, before there were many special departments, this appointment offered great scope and variety of experience, which Turney used to the full, emerging a skilled and wise physician. In the same year he was appointed to the staff. He married Miss Margaret Ferguson, sister of the famous ward "Charity," settled in Portland Place and entered on the work of an assistant physician—a heavier task at that time when it included responsibility for the post-mortem examinations on two days a week. It was not long before he created an entirely new department for diseases of the peripheral nervous system, cases of which had sometimes been dealt with rather perfunctorily before his advent. The importance and interest of these cases, when investigated and demonstrated on by an enthusiast such as Turney, rapidly ensured the popularity of the new venture, especially among the senior students, and it could easily have proved the nucleus of a complete neurological department if his own interests had not been too wide to allow him to confine himself to a single specialty.

From the portrait by O. Ouless 1929

As full physician Turney was an almost daily visitor to his wards; tall, with pale face and heavy drooping moustache, he was one of the most familiar figures in the hospital. He became a fine diagnostician and teacher, but his deep knowledge of medicine, combined with his critical and philosophical outlook, might lead him so to balance the pros and cons of a difficult case that while his masterly survey was a joy to the man up for his Membership it was sometimes rather heavy going for his clerks. Apart from his ward work, he took an active part in the administrative work of the medical school and was twice dean. Nor were his interests confined to St. Thomas's. He was president of the neurological section of the Royal Society of Medicine, choosing as the subject of his presidential address, vasomotor neuroses, and was one of the censors of the College of Physicians. He was also physician to the United Kingdom Temperance Insurance Office and he succeeded Sir Seymour Sharkey as medical referee to HM Treasury. Always keen on the welfare of nurses, for many years he was physician to the Nightingale Training School for Nurses at St. Thomas's and also chairman of the Nurses Coöperation.

These many activities, together with his private practice made his life a full one, and it was surprising how easily he carried the heavy load year after year. He played no games and his only exercise was the walking which his daily life involved, with an occasional stroll through Regent's Park. In the war of 1914–18 he was attached to the 4th London General Hospital and was awarded the OBE. In 1920 his appointment as physician terminated when he had reached the age-limit for retirement. He was elected a governor of St. Thomas's and for years was an active member of the grand committee, also serving for a time as almoner during Sir Arthur Stanley's treasurership. "He was one of those people," writes a colleague, "who confer distinction on any office. He was big in body and mind, profoundly courteous, cool in judgment and alert in his grasp of a subject. All this and an engaging humour, with an extraordinary facility for illustration and simile, made him a delightful companion and host, whether at his own fireside or at the houses he used to take for his summer holidays. Both he and Mrs. Turney were great lovers of Italy, and spent many a spring holiday exploring the old hill towns there. For many years his health had given anxiety to his family and friends but he himself, always indifferent to his own comfort, was the least concerned of all though at times he suffered much."

He died in London on Feb. 26 in his 84th year.

Notes and News

University of Cambridge

On March 11 the honorary degree of MA was conferred on Prof. D. G. E. Cordier who formerly held the chair of physiology at the Ecole Nationale Vétérinaire d'Alfort in the University of Paris. The degree of MChir was conferred by proxy on A. G. McPherson, and the degrees of MB, BChir on J. S. Pegum.

University of Sheffield

At recent examinations the following were successful:

FINAL EXAMINATION MB, CH B

Parts II and III.—E. S. Machell (second-class honours); E. S. L. Allott, G. D. Banks, Margaret A. M. Howard, Helen N. Mellanby and N. Aidan Vincent.

University of Dublin

On March 15, the following degrees were conferred at the school of physic, Trinity College:

MB, BCh, BAO.—D. H. Draper, C. J. Dugdale, C. W. C. McCreery, M. W. ffrench-O'Carroll, R. M. C. Tyner and I. H. R. Woodrow.

Smallpox in Middlesex

The number of patients associated with the outbreak of smallpox at the Mount Vernon Emergency Hospital, Northwood, Middlesex, is now 13; but 2 have proved not to be suffering from the disease. The source of the infection has been traced in every case. The number of deaths remains at 3, as previously reported. Two of the deceased had never been vaccinated, while the third had been once vaccinated, over 50 years previously. This patient was suffering from malignant disease.

X Rays on the Air

The discovery of X rays and the developments in scientific thought and in the affairs of daily life, which have resulted from it will be described in a dramatised feature programme to be broadcast on Monday, March 27, in the Home Service, at 9.20 PM. Nesta Pain has had the coöperation of Mr. Ralph Phillips, FRCS, in writing this feature, which she will also produce.

Royal Society

The following have been elected to the fellowship: Brigadier RALPH ALGER BAGNOLD, MA, AMIEE, explorer; RONALD PERCY BELL, fellow of Balliol College, Oxford; CECIL REGINALD BURCH, PH D, research physicist, University of Bristol; SUBRAMANYA CHANDRASEKHAR, associate professor in theoretical astrophysics in the University of Chicago; GEORGE EDWARD RAVEN DEACON, member of the scientific staff of Discovery Committee of the Colonial Office; Sir JACK DRUMMOND, D SC, professor of biochemistry in the University of London, at University College, and chief scientific adviser to the Ministry of Food; ALEXANDER THOMAS GLENNY, immunologist at the Wellcome Physiological Research Laboratories, Beckenham; RONALD GEORGE HATTON, D SC, director of the fruit research station, East Malling; ROBERT DOWNS HAWORTH, D SC, professor of chemistry in the University of Sheffield; WILLIAM OGILVY KERMACK, D SC, research chemist to the Royal College of Physicians of Edinburgh; FRANKLIN KIDD, D SC, superintendent of the Low Temperature Research Station, Cambridge; BRYAN AUSTIN MCSWINEY, MB, SC D, professor of physiology in the University of London, at St. Thomas's Hospital medical school; GUY FREDERIC MARRIAN, D SC, professor of medical chemistry in the University of Edinburgh; MICHAEL POLANYI, MD, PH D, professor of physical chemistry in the University of Manchester; ALEC SAND, comparative physiologist at the Marine Biological Station, Plymouth; Sir WILLIAM STANIER, MI MECH E, chief mechanical engineer to the LMS Railway; CYRIL JAMES STUBBLEFIELD, D SC, senior geologist in the Geological Survey of Great Britain; OSCAR WERNER TIEGS, D SC, zoologist in the University of Melbourne; HENRIK JOHANNES VAN DER BIJL, PH D, director of War Supply in the Union of South Africa and vice-chancellor of the University of Pretoria; JOHN HENRY CONSTANTINE WHITEHEAD, University lecturer in mathematics and fellow of Balliol College, Oxford.

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Royal College of Surgeons of England

Three vacancies on the council of the college are to be filled by election on July 6. The vacancies have arisen through the resignation of Sir Robert Kelly, and the retirement of Major-General C. Max Page and Major-General W. H. Ogilvie. The last two are seeking re-election, and the following eleven other candidates have also been nominated: Lieut-Colonel C. W. Gordon Bryan, Mr. H. H. Sampson, Air Vice-Marshal Geoffrey Keynes, Mr. R. J. McNeill Love, Mr. Rodney Honor Maingot, Mr. V. E. Negus, Mr. A. Dickson Wright, Prof. P. J. Moir, Air Commodore Stanford Cade, Mr. Charles Alexander Wells, and Mr. R. Milnes Walker. The names and seniority of the candidates will be found on p. 23 of our advertisement columns, along with a list of the council as at present constituted.

On March 20 Sir Alfred Webb-Johnson, the president, gave a luncheon at the College in honour of Major-General Norman T. Kirk, surgeon-general of the United States Army.

Those present included the United States Ambassador; Dr. E. A. Strecher, consultant to the Secretary of War; Major-General David N. W. Grant, air surgeon, US Army Air Force; Major-General Paul R. Hawley, chief surgeon, European Theatre of Operations, US Army; Brig.-General Malcolm C. Grow, surgeon, US Strategic Air Force; Colonel Elliott C. Cutler, chief consultant in surgery, ETO; Colonel James C. Kimbrough, chief of professional service, ETO; Colonel Rex L. Diveley, senior consultant in orthopædic surgery ETO; Colonel Derrick T. Vail, senior consultant in ophthalmology, ETO; Colonel Herbert Wright, chief of professional services, US Strategic Air Force; Surgeon Vice-Admiral Sir Sheldon Dudley, FRS, medical director-general, Royal Navy; Lieut.-General Sir Alexander Hood, director-general Army Medical Services; Air Marshal Sir Harold Whittingham, director-general, RAFMS; Major-General R. M. Luton, director of medical service, Canadian Forces in England; together with members of the council of the college.

Medical Superintendents Society

A meeting will be held at BMA House, Tavistock Square, London, W.C.1, on Saturday, April 1, at 2.30 PM.

Rehabilitation at LCC Hospitals

The London County Council, on the recommendation of their hospitals and medical services committee, will as opportunity arises extend their facilities for rehabilitation. They propose to have full rehabilitation centres at Joyce Green, Northern, Queen Mary's, Sidcup and Southern Hospitals, while there will also be centres at Hackney, Lewisham, St. Alfege's, St. James', St. Leonard's, and St. Mary Abbots Hospitals, for all except long-term and exceptional cases. Good facilities are already provided at Horton, Mill Hill, and Sutton Emergency Hospitals. The council are also to appoint 7 occupational therapists, 1 masseuse, and the equivalent of 4½ physical-training instructors. Medical and ancillary staffs at hospitals with rehabilitation departments will be granted leave with pay to attend the postgraduate courses in rehabilitation arranged by the Ministry of Health.

Royal Society of Medicine

The section of proctology will meet at 2.30 PM on Wednesday, March 29, at St. Mark's Hospital, City Road, E.C.1, for demonstrations of instruments, apparatus and specimens. On March 31, at 2.30 PM, the section of ophthalmology is holding a joint clinical meeting with the Ophthalmological Society of the United Kingdom.

Mental After Care Association

The sixty-fourth annual meeting will be held on Wednesday, March 29, at 2.45 PM, at Burlington House, Piccadilly, London, W1. The speakers will include Sir Otto Niemeyer, chairman of the Provisional National Council for Mental Health, Dr. J. Bram of the Polish medical services, and Colonel Henry Yellowlees, chairman of the association.

Medical Casualties

The following medical casualties have been announced.

Killed.—Captain J. J. Docherty, MB GLASG., RAMC; Captain Hugh Lauder, MB GLASG., RAMC; and Lieutenant A. Pearlman, RAMC.

Died.—Captain J. S. Burns, MRCS, RAMC; and Captain John Sheehan, MB NUI, RAMC.

Missing, presumed killed.—Surgeon Lieutenant D. L. Sandes, MB CAMB., RNVR, and Surgeon Lieutenant F. M. McRae, MRCS, RNVR.

Wounded.—Captain B. P. Armstrong, MRCS, RAMC; Captain C. M. Boucher, MB BELF., RAMC; Lieut.-Colonel J. N. Groves, MB CAMB., RAMC.

The MEDICAL REGISTER for 1944 contains 15,404 names, being 212 more than a twelvemonth earlier, but there were only 327 new names, 20% below the average increment for the previous five years. Deaths numbered 193, almost balanced by 189 restorations after compliance with registration rules. The foreign section of the list contains 176 names, only 6 of which have been added since 1939.

INFECTIOUS DISEASE IN ENGLAND AND WALES

WEEK ENDED MARCH 11

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 2 (1 in Paddington, 1 in Pudsey, Yorks); scarlet fever, 2215; whooping-cough, 1906; diphtheria, 624; paratyphoid, 3; typhoid, 0; measles (excluding rubella), 2098; pneumonia (primary or influenzal), 1178; puerperal pyrexia, 173; cerebrospinal fever, 90; poliomyelitis, 3; polio-encephalitis, 2; encephalitis lethargica, 0; dysentery, 208; ophthalmia neonatorum, 84. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on March 8 was 1820. During the previous week the following cases were admitted; scarlet fever, 128; diphtheria, 34; measles, 64; whooping-cough, 55.

Deaths.—In 126 great towns there were no deaths from enteric fever or scarlet fever, 2 (0) from measles, 8 (1) from whooping-cough, 12 (0) from diphtheria, 35 (5) from diarrhœa and enteritis under two years, and 42 (5) from influenza. The figures in parentheses are those for London itself.

Birmingham reported 5 deaths from influenza and 5 from diarrhœa.

The number of stillbirths notified during the week was 256 (corresponding to a rate of 34 per thousand total births), including 30 in London.

Appointments

FRIEDLANDER, DAVID, MB CAPE TOWN, MRCOG: obstetrician at the North Middlesex County Hospital, Edmonton.

PARKER, ALEXANDRINA, M. M., MB EDIN.: temp. asst. MOH for maternity and child welfare, Halifax.

QUANTRILL, D. W., MB BIRM.: MO, Nigeria.

Manchester Royal Infirmary.—The following surgical assistants have been appointed:

GOLDBERG, H. M., MB LOND., FRCS;
SHRIMPTON, JANET, MB CAMB.; and
CHAMBERS, A. W., LRCPE.

Births, Marriages and Deaths

BIRTHS

BUTLER.—On March 13, at Chigwell, the wife of Mr. E. C. B. Butler, FRCS—a son.

BYRNE.—On March 13, at Pewsey, Wilts, the wife of Dr. J. Connel Byrne—a daughter.

CLOTHIER.—On Feb. 25, in London, the wife of Major J. G. Clothier, RAMC—a son.

FISHER.—On March 12, at Abingdon, the wife of Surgeon Lieutenant J. H. Fisher, RNVR—a son.

GAISFORD.—On March 18, the wife of Dr. Wilfrid F. Gaisford, of Rowington, near Warwick—a daughter.

HOULTON.—On March 11, the wife of Dr. A. C. L. Houlton—a son.

MATHESON.—On March 12, in London, the wife of Mr. Iain Matheson, FRCS—a son.

MAY.—On Feb. 28, at Burnham-on-Sea, the wife of Surgeon Lieut.-Commander R. T. May, RN—a daughter.

POWELL.—On March 14, at the North Oxford Nursing Home, to Jill Marie (*née* Ellis), wife of Dr. Ralph Powell—a daughter.

PURCE.—On March 13, the wife of Dr. James Purce, of Basford, Stoke-on-Trent—a son.

ROGERSON.—On March 12, at Hartshill, Stoke-on-Trent, the wife of Dr. C. H. Rogerson—a son.

SCOTT.—On March 9, the wife of Dr. Gordon Scott, of Shipton-under-Wychwood, Oxford—a son.

SPARE.—On March 17, at Leicester, the wife of Captain J. T. Spare, RAMC—a daughter.

WELLS COLE.—On March 12, at Lincoln, the wife of Surgeon Lieutenant G. H. Wells Cole, RNVR—a son.

MARRIAGES

GLEGG—HEADINGTON.—On March 14, at Stubbings, Berks, Robert Ashleigh Glegg, of Lewes, Sussex, to Ida Winifred Headington.

DEATHS

CALVERLEY.—On March 12, at Plymouth, William Marmaduke Calverley, MB MANC., Barrister-at-law.

HAY.—On March 12, at Montrose, Walter Hay, MB GLASG., aged 83.

HINDLEY.—On March 14, Godfrey John Douglas Hindley, MC, MA, DM OXFD, of Redcliffe Gardens, S.W.10, aged 72.

HUTCHESON.—On March 14, at Douglas, I.O.M., George Hutcheson, MB LOND., lieut.-colonel, IMS retd., late inspector-general of civil hospitals and prisons, Assam, India, aged 69.

PIKE.—On March 12, Norman Howard Pike, MB LOND., Cheltenham, aged 71.

PRAIN.—On March 16, at Whyteleafe, Sir David Prain, CMG, CIE, LLD ABERD. and ST. AND., MB EDIN., FRS, lieut.-colonel IMS retd., sometime director of the Royal Botanical Gardens at Kew.

WALKER.—On March 13, at Outlane, Huddersfield, Joseph Eagland Walker, MRCS, aged 83, formerly of Bexley, Kent, aged 83.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export.

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REFERENCES AND ABBREVIATIONS

Institutions and Corporations with the right to the prefix Royal will be found under that prefix, with the exception of Medical Societies, which are separately indexed under Societies. All Universities are indexed under the word Universities. (*A*) = *Annotation*, (*C*) = *Correspondence*, (*LA*) = *Leading Article*, (*ML*) = *Medicine and the Law*, (*NI*) = *New Invention*, (*NP*) = *New Preparation*, (*O*) = *Obituary*, (*P*) = *Parliament and* (*R*) = *Review.*

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